आत्मनिर्भर भारत

MAKE IN INDIA

DGAQA - AFQMS

APPROVAL OF FIRM AND ITS QUALITY MANAGEMENT SYSTEM (AFQMS)

ISSUE-III

AUGUST 2024

(Supersedes AFQMS Issue-II June 2018)

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सत्यमेव जयते
DGAQA
AERONAUTICAL QUALITY ASSURANCE
गुणवत्ता आश्वासन से उड़ान सुरक्षा

सत्यमेव जयते

सचिव (रक्षा उत्पादन)

SECRETARY, DEFENCE PRODUCTION

FOREWORD

AFQMS Issue-III embodies the spirit of "Atmanirbhar Bharat" and the "Make in India" initiative. Military Aviation is a demanding domain, characterized by high stakes and extreme operational conditions where precision and reliability are not just critical but non-negotiable. The safety of human lives and the protection of invaluable assets depend on the highest standards of Quality, Safety, and Reliability. As such firms dealing in Military Aviation need competence to manage Quality, Safety and Reliability standards for Air Defence preparedness of our country.

I am pleased that the Directorate General of Aeronautical Quality Assurance (DGAQA), the Government Quality Assurance Authority (GQA) for Indian Military Aviation, continues to adapt to rapid technological advancements and the evolving landscape. This document introduces conceptual, structural, and procedural reforms in Quality Assurance (QA), fostering an environment where defense industries can excel while meeting the rigorous quality demands of our armed forces. The AFQMS - Issue III aligns with IMAP-2023 emphasizing a self-regulatory regime and the adoption of the latest international standards such as AS 9100D:2016 for Quality Management Systems.

By using this document for approving firms (including R&D Labs, OFs, PSUs, and Private firms) and conducting QA activities in military aviation, the DGAQA ensures that these entities possess the necessary competence and effective QMS to deliver products and services of the highest quality, safety, and reliability standards. This, in turn, will bolster confidence and satisfaction levels among user services.

I urge all involved in the Design & Development, Production, Repair, Overhaul, Servicing, and Modification of Indian Military Aviation Stores to utilize this publication effectively. I trust that AFQMS Issue-III will catalyze Quality Assurance reforms within the Defense sector, advancing our journey towards self-reliance and an Atmanirbhar Bharat in Military Aviation.

नई दिल्ली

गिरिधर अरमाने

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DIRECTOR GENERAL, AQA
महानिदेशक , वैमानिक गुणवत्ता आश्वासन

PREFACE

The provision for approval of a Firm, its Quality Management system wherein approval to QA/QC Personnel of Main Contractor by DGAQA is in vogue since last six decades. The main objective is to ensure Flight Safety through requisite Quality and reliability of Military aviation stores as well as to enhance assurance to Users satisfaction towards the compliance of stipulated Quality requirements by the DGAQA-AFQMS approved firm. The AFQMS also empowers DGAQA approved QC/QA personnel to certify inspection activities/ tasks as authorised personnel, facilitating final acceptance and release of the store to User services by DGAQA.

The issue of AFQMS issue III document by Government Quality Assurance Authority i.e. DGAQA dealing with "Approval of a Firm and its Quality Management System" has been necessitated due to rapid advancement & fast evolving professional conception in the field of quality assurance during design, development, production, overhaul/repair & maintenance of military aviation stores. Areas like project management, configuration management, risk analysis, extensive outsourcing, counterfeit parts, organisation knowledge management, coupled with use of high end technologies have all impacted quality management.

Keeping in line with the Government drive of Aatmnirbharta & Make in India Program, the MoD has emphasised on QA reforms in Military Aviation. Efforts are being made in simplification of documentation & procedures, encouraging self certification for non critical stores, framing of policies for speedy indigenisation and employing third party inspection agencies etc. This AFQMS issue-III document has incorporated the changes to align with self-reliance &"Make in India" Program, DGAQA thrust on moving towards regulatory function and self - control regime. Adaptation of latest International Standards on QMS requirements i.e. AS 9100D & suggestions from all stakeholders have been taken into account.

Recently revised DDPMAS in the form of IMAP-23 stipulates the necessity of approval to Design, Production and Maintenance organisation involved in Military Aviation sector that streamline the process, The same have also been incorporated in AFQMS issue-III : 2024.

This document will guide the stakeholder & Industry partners towards the quality assurance requirements for military aviation stores and adopt best Global practices with ultimate objective of achieving self certification by the industry.

I am sure this document will rationalize quality assurance management functions in Indian military aviation at par the global quality standard to meet the User services requirements and also ensure ease of doing business to achieve complete self reliance/ Aatmnirbharta in the field of Military Aviation.

Sanjay Chawla
DIRECTOR GENERAL, AQA

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LIST OF AMENDMENTS

Sl. No.	Amendment No	Date of Amendment	Brief of Amendment	Authority

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Note: All changes wrt AFQMS – Issue-II in AFQMS-Issue-III Part–I reflected as bold & italic and in Part-II as bold italic & Underlined.

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PART - I

APPROVAL OF THE FIRM

SECTION - I

GENERAL

1. INTRODUCTION

Directorate General of Aeronautical Quality Assurance (DGAQA) is the ***Government Quality Assurance (GQA)*** Authority & Regulatory Body for Military Aircraft, Aero engines and Airborne Stores (Including it's Associated Systems/ Accessories/Armaments and Ground Support / Handling Equipment) under the aegis of Department of Defence Production, Ministry of Defence, Government of India.

Quality, Safety and Reliability is of paramount importance in Military Aviation as it demands highest performance under extreme as well as adverse conditions involving precious human life, costlier flying machines and approaching engineering limits of man, machine, materials etc. Therefore firms dealing in Military Aviation should be competent and able to manage its Quality Management System effectively to deliver products and services which are meeting desired quality standards and are safe and reliable.

Quality of the product is primarily the responsibility of its manufacturer and it is desirable from them to abide by the Total Quality Management (TQM) principles in their respective organisation as well as to upkeep with the relevant International Industry standard such as AS9100 for their QMS of which QA and QC are sub-functions. In accordance to ISO9001: 2015, QC is defined as "A part of Quality Management focussed on fulfilling Quality requirements" and QA as "Part of Quality management focussed on providing confidence that Quality requirements will be fulfilled". QC refers to Witness the testings, Verification of documents etc for product conformity. QA refers to Internal Audit, Product/ Process audit, Spot/Surveillance check, Control of Non conformances, Corrective & Preventive action, Procedure & Process verification etc.

Government Quality Assurance (GQA) is the process by which the appropriate national Authority i.e. DGAQA for Military Aviation establishes confidence that the contractual requirements are met. GQA is a higher level function over & above the QC & QA functions of the firm/main contractor. The Main contractor shall establish their own QA function while Government QA oversight is by DGAQA. GQA consists of multiple activities which are applied across the procurement and support elements of the MOD acquisition process to deliver technical assurance towards risk management i.e. internally and across the contractual boundary, where ever applicable. GQA consists of stipulationg QA requirements, approval, surveillance, audits, reviews, assessment, evaluations, verification, re-verification of CTQ inspection /test stages, examination etc. Examination techniques might include testing, inspecting, witnessing, verifying, validating or other techniques that provide objective evidence that contractual requirements are being satisfied.

By means of Approval of firm and its Quality Management System (AFQMS having In-built AS9100 D requirements), DGAQA performs its mandated GQA function at production organisation/Main Contractor domain through overseeing their Quality Management System (QMS) and evaluate its effectiveness by means of Audits (System, Process, Product), Personnel Approvals, Special process approvals, Surveillance, Spot Checks and re-verification of the product through CTQ check points (10-20%) as per DGAQA approved QAP.

Depending upon the scope of approval for the firm, Approval granted will cover the following categories as per IMAP-2023:-

(i) Air System Production Organisation Approval (ASPOA) for the organisations involved in manufacturing of an Air System.

(ii) Store Production Organisation Approval (SPOA) for the Organisation involved in manufacturing of Airborne Stores used in an Air System.

(iii) Air Systems Maintenance Organisation Approval (ASMOA)

(iv) Store Maintenance Organisation Approval (SMOA) for organisations involved in maintenance/overhaul/servicing of Airborne Stores used in an Air System.

(v) Other organisation involved in design & development activities for Manufacturing of Prototype of Air systems & stores.

To demonstrate its competence and enhanced assurance towards compliance to the quality requirements for military aviation store intended for user services, Firms/Organisations (DPSUs, R&D Labs, OF-DPSUs, PSUs, Public/Private firms) dealing with Design & Development, Production, Maintenance, Repair, Overhaul, Servicing and Modification of Military ***Air systems*** /Airborne Stores viz Aircrafts Helicopter, UAVs, Aero-engines, Air Armaments, missiles, Electrical & Electronics, Ground systems, Radars, ***Fuel, Oil & Lubricants, Aviation Gases*** etc., shall be eligible to obtain firm's approval from DGAQA for carrying out such regular activities against Defence Supply Orders for which DGAQA has been identified as the QA/Inspection Authority.

2. GRANT OF AFQMS

2.1 A firm seeking AFQMS approval of DGAQA should provide evidence that either the firm is in possession or likely to receive an order from user services or MoD for design & development/ supply/service of military airborne stores and associated Ground Handling/Ground Support Equipments. On receipt of such application, DGAQA or his authorised representatives shall undertake audit of the firm for assessment of their resources including effectiveness of their Quality Management System. Part-II of this document deals with the detailed requirements of Quality Management System for such firms.

2.2 A firm seeking approval should apply to DGAQA Ministry of Defence, New Delhi through Regional office (wherever available) in the format of application given at Appendix `A'. Subsequently DGAQA detail a Team to assess the firm's capacity with respect to infrastructure, human resources, workshop facilities and existence of Quality Management System (Requirements given in Part II of this document). The duty of the assessment team will be to satisfy that the firm has the capacity and resources which will facilitate it to execute the specified class and nature of work satisfactorily as per the requirements.

2.3 If the infrastructure, resources and existence of an existing Quality Management System are satisfactory, a letter and Certificate of approval will be issued to the firm by DGAQA.

NOTE: It should be understood that the grant of 'Approval' only indicates that at the time of granting approval, the Firm's Organization fulfilled all the requirements for such approval. The Supervising Representative(s) from the DGAQA will carry out periodical assessment of the approved firm(s). The continuation of the approval will be subject to the periodical verifications showing that the required standards are being maintained.

2.4 DGAQA/ Resident in-charge shall be responsible for executive Q.A. function & effective supervision on continual basis for assuring that the products/services supplied by the main contractor meet the specified requirements.

2.4.1 Level of intervention of DGAQA and Re-verification of stages will be mutually decided based on performance of stores, its criticality and effectiveness of the firm's QMS ***and same to be mentioned in the DGAQA approved QAP.***

2.4.2 ***QAP shall be reviewed annually for DGAQA stages. Any changes in DGAQA stages shall be documented with proper justification and annoted in records.***

2.4.3 ***Any delegation of DGAQA stages to alternate DGAQA officer/DGAQA approved QC personnel shall be done at level of Group head/ OiC/HoE.***

2.4.4 ***Any remarks on Inspection memo with respect to procedural/ Technical non compliance by concerned DGAQA officer can be reviewed by at least one level up senior officer.***

2.4.5 Conduct of Quality audits, spot/surveillance checks by DGAQA shall be based on criticality of stores, areas of concern, priorities and customer complaints.

2.4.6 For major projects, at the start of each project, the level of DGAQA intervention & stages of re- verification will be mutually determined between DGAQA & the Main Contractor based on, Contractual stipulations, OEM document (If any) and risks involved. ***The Main Contractor shall prepare & get approved development QAP & Production QAP from DGAQA within 30 days after approval of QTP & provisional clearance respectively from CEMILAC.*** Periodic/Annual review of the same shall be done by DGAQA in co-ordination with the main contractor which shall be applicable for supplies / deliveries of product and services by both main and sub-contractors.

2.5 Pre-requisites for grant of Approval:

2.5.1 Approval may be granted subject to satisfactory assessment of the firm by DGAQA after ensuring the availability of the following:

(i) Requisite infrastructure, buildings, workspace and associated utilities, process equipment and supporting devices such as transport, communication etc.

(ii) Availability of experienced and trained manpower having requisite competency and skill for carrying out specified activities on the aircraft and associated systems/ accessories. This shall include organisation for ensuring quality of products/services.

(iii) Inspection / Test facilities, applicable tools and fixtures, Machineries & associated Ground Support Equipment/Systems specified in the technology of proposed activity.

(iv) Controlled Work environment such as Temperature, Humidity, Lighting, Cleanliness etc, as applicable, to achieve conformity to product/service requirements.

(v) Implementation & Maintenance of Quality Management System and continuous improvement of its effectiveness.

(vi) Well defined and documented Quality Manual and Quality procedures for Control of Documents, Control of Records, Internal Audit, Control of Non-Confirming Products, Corrective & Preventive Action, Outsourcing, First Article Inspection Requirements and FOD management in line with Aerospace Recommended Practice (ARP)/Relevant Aerospace Standards

(vii) ***It is Mandatory that the firm shall have AS9100 certification, NABL accreditation (for Test Laboratory / Metrology / Calibration/Environmental labs) and NADCAP approval desirable for special processes, as applicable.***

(viii) ***The firm shall have provision for Incentivizing Quality work and Functional Independence to QA/QC personnel. It shall be included in Quality procedures & monitored by top management by way of rewarding the best performance of QA/ QC personnel.***

(ix) ***The firm shall ensure participation of DGAQA representative as an observer during the audit for AS9100 certification, NABL accreditation and NADCAP approval. The certification /Accreditation body may also involve DGAQA as an observer during their Certification/Accreditation process at Defence PSUs, Oil PSUs, DRDO Labs, Pvt Industries etc. associated with Military Aviation stores.***

(x) The firm shall also have the clearances from local authority/ body for registration of the firm to carry out the business and meeting all statutory and safety requirements meant for the type of industry.

2.5.2 Primary responsibility for quality of products/ services rests with the main contractor including its sub-contracted / outsourced product/ service (Including chain of sub-contractors). ***Main Contractor shall ensure acceptance of industry standard quality assurance requirements such as AS9102 (First Article Inspection) for its vendor / sub-contractors/ their supply chain.***

2.5.3 Procedure for non-conformance control of products/services shall be strictly followed (Root cause analysis, Preventive/ Corrective Action) as per defined documentation.

2.5.4 Non-conformances with respect to Ground Support Equipment or testing requirements vis a vis specifications are to be controlled as per documented procedure and shall be disposed off/ approved by DGAQA.

2.5.5 Only acceptable products/ services will be offered by the concerned approved ***QC*** personnel of the main contractor to DGAQA representative(s) for re-verification as per agreed programme identified in the DGAQA approved QA Plan. ***DGAQA Control Points (memo stage) will be offered in format AFQMS (F-1006 A) Appendix 'F' and Inspection Memo for Main contractors QC delegated stage as per DGAQA approved QAP shall be as per format AFQMS (F-1006 B) Appendix 'G'.*** A non–conformity observed in a stage/ product accepted by DGAQA during the subsequent production build-up or prior to its delivery to the customer, shall be notified to DGAQA before taking up any action to correct the Non conformity. Main contractor top management should take serious note of the non-conformances reported by DGAQA representatives during their check stages inclusive of observations during spot/ surveillance checks as these will be indicative of discrepancies in the Quality Management System of the firm.

2.5.6 ***Only DGAQA approved QC inspectors are authorised to carry out & certify the Inspection activities during repair/servicing/modification carried out by Main contractor at operating bases.***

2.5.7 The validity of approval is subject to satisfactory Periodical Audits by DGAQA. Non-Conformances of minor nature during such audits will need to be corrected at the earliest possible. In case of Major Non-Conformances or not adhering to given time frame for resolution of other non-conformances, issue may need to be taken up with top management for resolution.

2.5.8 Any change in the scope of approval of products/personnel should be mandatorily brought to the notice of DGAQA ***immediately*** for appropriate action/amendment in the approval letter by DGAQA who will take appropriate action within next one month of receipt of information from the main contractor.

2.5.9 For renewal of approval, the firm shall apply at least 4 months in advance through respective Regional Director/Resident Officer-In-Charge, DGAQA with an advance copy to HQ, DGAQA. On receipt of the application, the concerned ADG/ RD should ensure the requisite audit

and ensure closure of NC's 60 days prior to the date of expiry of the approval. The case for renewal of approval at HQ will be processed within 30 days on receipt of recommendation from respective Regional Director/Resident Officer-In-Charge, DGAQA.

NOTE: Redressal in case of disputes, if any, on the understanding and implementation of this document between the Resident Office of DGAQA and the Main Contractor shall be addressed by HQ, DGAQA and Corporate Office of the Main Contractor.

2.6 AFQMS ASSESSMENT AND APPROVAL FEE

The fee for Fresh approval / Renewal shall be as under:

Type of Firm	***Fresh Approval Fee in Rs***	***Renewal Fee in Rs***
Micro Small Medium Enterprises (MSMEs)	***25,000/-***	***10,000/-***
Large Enterprises	***50,000/-***	***25,000/-***

The fee is subjected to the condition that application for renewal is submitted within stipulated time frame. All other cases shall be treated as fresh approval. The fee paid is non refundable. The fee shall be payable to Account officer, DGAQA, New Delhi along with application form. The fee will be valid for one year (from the date on which the assessment is completed as declared by DGAQA assessment team) or one re-assessment, whichever is earlier. Re-assessment can also be requested by the firm in case the approval is not granted by DGAQA after initial assessment.

3. CATEGORIES OF APPROVAL

3.1 DGAQA Approval may be granted for the following categories:

3.1.1 Design **&** Development/ Manufacture/ Repair/ Overhaul of Aircraft, Aero- engines, Air Armaments, Missiles, UAVs, Electrical and Electronic Equipment, Instrument, ***GSE/GHE*** etc, and their components / accessories /Raw Materials including critical aircraft consumables such as Fuel, Oils & Lubricants produced indigenously.

3.1.2 Process workshops (Protective Treatment, Heat Treatment, Plating, Surface Treatment, Painting etc.).

3.1.3 Stockists of the above, for Certification that they are re-consigning parts or materials received from approved sources including foreign origin in the condition in which received & storage in specified environment conditions and periodic servicing as per requirement.

3.1.4 Test Houses or Laboratories for testing to specific requirements/specifications.

NOTE : Depending upon the scope of approval for the firm, Approval granted will be

considered in following categories of approval as per IMAP – 2023.

(i) Air System Production Organisation Approval (ASPOA) for the organisations involved in manufacturing of an Air System.

(ii) Store Production Organisation Approval (SPOA) for the Organisation involved in manufacturing of Airborne Stores used in an Air System.

(iii) Air Systems Maintenance Organisations (ASMOA)

(iv) Store Maintenance Organisation (SMOA) for organisations involved in maintenance/overhaul/servicing of Airborne Stores used in an Air System.

(v) Other organisation involved in design & development activities for Manufacturing of Prototype of Air systems & stores.

Any other category of approval not mentioned above may also be considered on as required basis.

3.2 Change in scope of approval:-

3.2.1 Approved Firm shall inform HQ, DGAQA through resident RDAQA/Officer In- charge for any change in scope of approval required.

3.2.2 HQ, DGAQA through their authorized representatives shall have further assessment of firm's facilities and capabilities for the changes sought and decide accordingly.

3.2.3 ***The Validity of the fresh DGAQA approval shall be for a period of 3 years (01year as provisional & extended to further 02years. The validity for renewal of DGAQA approval is 5years.This would be subject to satisfactory QRMM rating, Process capability Index, and periodic assessment by DGAQA.***

3.3 *Approval of DPSU/firm's extended facility established at a different location in view of User requirement.*

3.3.1 ***Application for approval may be made on same prescribed format with indicating change/variation in organisation structure with regards to the extended facility. Extended facility shall be audited by concerned DGAQA office for assessment of Firm's QMS in-place and other infrastructure requirements. For required scope of activities, requirements enlisted in Section –III para 1.2, 1.3 & 1.4 shall apply, if required to be positioned at extended facility. Head of Quality of the firm shall remain overall accountable for extended facility also. However, Oi/C(Quality) of the extended facility as defined by firm shall be considered as additional release note signatory on request.***

3.4 *Performance Based Logistic (PBL) support purpose Field Service Representatives (FSR) Set-up.*

3.4.1 ***Such FSR set-ups created for PBL support shall be considered as extensions of the parent firm and shall be covered under AFQMS of the firm. The scope of activities performed***

by FSR under PBL shall be periodically audited by Head of Quality of the firm ensuring the AFQMS requirements. DGAQA audit shall also cover the FSR set up during AFQMS approval/renewal.

3.5 ***Self Certification (Green Channel Concept): The firm having complete automation in process control such as oil refineries, gases etc can be granted with AFQMS entrusted with self certification for product release to the user services i.e. QAP with non stage gated approach. However the process should be stable, consistent and process capability to be assessed. The process capability index for those processes critical to Quality of the product should be determined and maintained.***

3.6 ***Self Approval/ Enhanced Delegation: AFQMS firms may be extended with enhanced delegation through Quality Rating Maturity Model (QRMM) which defines the criteria/ parameters and assessment procedure to entrust the Manufacturer to graduate and exercise self control on all in-process tasks. Enhanced delegation / self approval may also be extended for non critical Airborne stores , associated test rigs & TTGEs etc based on efficacy of QMS, Past performance, Users feed back etc. Based on QRMM Maturity level of the firm after DGAQA assessment, the level of enhanced delegation shall be jointly considered during annual review of QAP.***

4. SUB-CONTRACTS/OUTSOURCING:

A firm may be a Main Contractor for some contracts and Sub-Contractor for others. All the sub-contract / outsourcing activities will be governed as per the DGAQA Guidelines/ directive issued for QA during outsourcing . But whether a firm is acting as a Main Contractor or Sub Contractor, does not affect its status as an Approved Firm, provided it fulfils the necessary conditions. DGAQA involvement in subcontracts/ outsourcing activities of the Main Contractor is generally limited to critical stores. Further, Main Contractor can utilise this document for according approval to its Sub-Contractor and its Quality Management System i.e "Approval of Sub-Contractor and its Quality Management System". Further, main contractor outsourcing procedure/ documents shall also elaborate guidelines to assess, evaluate and control their sub-sub contractors/ sub vendor i.e subcontractor to their sub-contractor/ vendors.

5. SPECIAL REQUIREMENTS FOR APPROVAL IN THE AREAS OF SOFTWARE DESIGN AND DEVELOPMENT:

Indigenous manufacturers involved in Design and Development in embedded system software for Airborne Applications, Ground System Software, Rig System Software and ATE Software should have sufficient In- house expertise in software development, testing and flight evaluation. The manufacturer should comply with the certification requirement as ***specified by Airworthiness authorities specified in IMAP-2023, IMTAR 21 Version 2.0 & respective AQA directive.***

SECTION - II

SALIENT FEATURES FOR APPROVAL OF FIRM AND IT'S PERSONNEL

1. INTRODUCTION

While the Quality Management System of the firm should meet the requirements given in part-II of this document, other features specific to the firm and its QA organisation are as given below:

1.1 ***The Corporate Quality Head shall be independent, shall perform QA duties explicitly and shall be reporting to the Top Management of the organisation.***

1.2 APPROVAL OF CORPORATE QUALITY HEAD

1.2.1 ***Corporate Quality Head shall be appointed by the organisation, minimum at the rank of General Manager/ED/ Board of Directors level. As part of DGAQA AFQMS assessment, Approval to the Corporate Quality Head shall be considered.***

1.2.2 ***Corporate Quality head shall issue corporate quality assurance guidelines CQAG in due consultation with DGAQA and shall effort to bring uniformity in Quality procedures adopted across various divisions.***

1.2.3 ***He/She shall assess and recommends the candidature of Head of Quality at division level and shall be the reporting authority. He/She shall be overseeing the Quality related issues at various divisions and issue necessary instructions/Guidelines on continual basis.***

1.2.4 ***He/She shall appraise top Management and HQ DGAQA on all serious quality issues and maintain effective coordination with all stake holders.***

2. APPROVAL OF Q.A. PERSONNEL

2.1 The head of QA Department of the firm will be the one approved by DGAQA by name. He/*She* shall have an adequate number of QA /QC personnel (approximately 10% of manpower at the firm premises directly involved in production and testing activities) working under him to ensure execution of inspection/QA activities at all the technical work centres of the organisation. He/She shall also co-ordinate approval of the QA personnel from resident DGAQA office/DGAQA HQ for respective scope of work. He/She shall be responsible to ensure that only competent & approved QA personnel certify the activity in respective work centres.

2.2 ***Head of the Quality Assurance Department shall be Management representative (MR) & shall have responsibility & full authority for oversight of Quality Management system. He shall be of the level of Divisional head or just one level below the rank of divisional head.***

2.3 He/She will be placed under the functional control of corporate management/ CMD/ Corporate Quality Head of the firm and not to the local unit head to avoid conflict of interest. He/She shall be given adequate authority & freedom by the corporate management of the firm to ensure effective functioning of the QA Department, Quality Management System and to resolve matters pertaining to quality. All personnel in the quality department shall be under functional as well as administrative control of the Head of Quality Assurance Department.

3. APPROVAL OF OPERATORS AND THEIR COMPETENCE

3.1 Firm's management is responsible for establishment of a system to approve the operators for carrying out a specified job. Selection process will take into account qualification, training, experience and competence level of the personnel. A suitable representative from the firm's Q.A. department shall be a member in the selection process of the operators. Periodic review of such personnel will be part of this system. DGAQA will oversee that the system is in place, effective and adequate records are maintained.

3.2 There will be provision for self inspection by operators who are found to be competent by QC department of the main contractor and also meeting the inspection approval requirement of the DGAQA. However suitable guidelines on the procedure to be followed in such cases would need to be prepared by the Main Contractor in co-ordination with DGAQA.

4. PERSONNEL INVOLVED IN SPECIAL PROCESSES

4.1 Personnel carrying out special processes such as WELDING, NDT etc shall be approved by DGAQA after assessing their education, training, experience, competence, Medical fitness and special tests if any. ***The validity of welder approval is one year from the date of approval/renewal.*** Only personnel approved by DGAQA or other Govt. Approved agency shall be authorised to carry out and certify such activities. There will be provision for periodical review of these approvals. NDT level-II is required for QC personnel certifying the NDT test and level-III is required for QC personnel approving the Test plan/ procedure for NDT test. Such QC personnel should be certified to Level-II & Level-III by ASNT/ISNT/ ***NAS – 410.***

4.2 As regards process of SOLDERING, The firm will have in-house guidelines for assessment and approval of personnel involved in such type of processes. The soldering personnel shall be in possession of valid certificate from Institute of Printed Circuit (IPC).

There will be provision for periodical review by DGAQA of all the special processes including that of soldering. ***It is desirable to have NADCAP accreditation for special processes such as Non-Destructive Testing, Coating, Welding, Chemical Processing, Heat Treatment etc.***

5. TECHNOLOGY FOR EXECUTION OF SCOPE OF ACTIVITIES

The firm will have in place duly approved technology from authorised agency for carrying out scope of activities including requirement of special processes, if any.

6. ACCOMMODATION AND EQUIPMENT

The Quality Assurance Department shall have requisite accommodation and equipment for adequate process – control and / or efficient inspection and functional tests. Equipment may include precision tools, instruments, test apparatus etc., and facilities to check their accuracy and calibration periodically against standards having traceability to national/ international standards so as to ensure continued serviceability and reliability. The firm will also be required to provide at the work centres adequate furnished accommodation and essential communication facilities with adequate numbers of ERP/LAN terminals etc to Resident DGAQA office to enable DGAQA to work in line with the firm's working system.

7. STORES

The firm should have suitable stores, inward goods inspection procedure and satisfactory system of stores documentation system to effectively control the receipt, storage and issue of aeronautical equipment, item & material. Materials awaiting disposition or having evidence of incomplete inspection, are to be quarantined in a separate store maintained for the purpose, and will be called "Quarantine Store". All items, parts, and sub-assemblies or materials which have passed Inspection with valid shelf life are to be properly stored in "Bonded Stores" and these alone are to be used for aeronautical purposes. The stores will have requisite environmental control viz temperature, humidity, cleanliness, lighting etc as per the specified requirements of respective type of products.

8. RECORDS

A system of process [job / route] cards or other records are to be maintained for each item, so that:

8.1 Quality Assurance documentation is maintained through all stages of manufacture / overhaul / repair and / or storage.

8.2 The personnel responsible for each stage can be identified. These records are to be preserved by the firm for a minimum period of Ten Years or next overhaul, whichever is

later. However, in the case of FOL, the same may be kept as per the retention period mentioned in the Quality Assurance System of the firm.

8.3 The system of recording will also ensure the identity of raw materials / or the component / manufacturer / Lot No. etc., so that full details can be traced at any stage of manufacture / overhaul / repair.

8.4 In case of FOL, samples of batches produced/supplied should be retained for a period equal to one year more than the authorised shelf life of respective consumable as per type record/ specification except ATF which should be retained for a minimum period of one month.

9. TESTING

Physical or Analytical testing for which the firm is not equipped, is to be carried out by a Laboratory approved/ accredited for the purpose by the DGAQA or NABL. For special testing requiring advanced technology/ equipment, firms/labs of national/international repute can be considered with prior approval from DGAQA. Test reports are to be relevantly recorded to enable the sample tested and result obtained to be co-related and shall conform to applicable standards. In case of non-conformance, full lot shall be quarantined and will be put-up to authorized committee / board for further disposition as per existing provisions of DDPMAS.

10. RELEASE NOTES/Q 423/I-Note

All deliveries and releases of Aeronautical Equipment and Stores shall be accompanied with Release Note/ Inspection Note/ Form Q423. These are to be issued serially.

The ***advise and Inspection Note (form Q423)*** for Aircrafts/ Aero engines/ Major systems and critical stores shall be signed by the DGAQA approved Quality Head of the main contractor and for other detail parts/ non-critical stores/GHE/GSE/TTGE etc shall be signed by approved QC in -charge of shipping QC before final clearance by DGAQA.

The form Q 423 shall be counter signed by DGAQA for all deliveries of Aeronautical Equipment and Stores for the Indian Military Customers. This requirement shall take precedence over the contractual requirements between the Approved Firm and the Customer i.e User Services.

11. INSPECTION STAMPS

The products of an approved firm, before their induction / installation on an aircraft/aero engine/electronic and electrical equipment etc. or issue to another firm, must bear an Inspection Stamp as an evidence of having been produced to the required standards. The inspection stamp may be affixed on the product or/and appropriate inspection document

depending upon the type of product. In case of FOL items, released products should be accompanied with a certificate of conformity bearing the stamp & signature of the approved Test Report Signatory. The design of these stamps shall be submitted to DGAQA for approval and agreed, before the Approval of the firm and its Quality Management System (QMS) is granted. Metal and rubber stamps in suitable sizes shall be provided and in case of metal stamps, it is important that the border should be of a design in which sharp corners are avoided. Further precautions to be observed on the inspection stamps are as follows:

11.1 Metal stamps should be used only for metallic parts which are not liable to damage thereby.

11.2 Rubber stamps are to be used for metallic parts which might be damaged by the impression of a metal stamp such as parts constructed of tubing or strip. For the same reason, rubber stamps should be used on non- metallic materials.

11.3 When the parts are too small for individual marking, the parts are to be bundled and the Inspection Stamp impressed on the tape or label appropriately attached to the bundle.

11.4 As these Stamps are individual specific & not generic, hence non-transferable.

12. OPERATOR IDENTIFICATION

Firm's management will devise a methodology for identification & traceability of operators carrying out work on airborne stores. This may be in the form of stamp/PB Number/Unique Identity number etc.

13. STAMPS FOR SPECIAL PROCESSES

After satisfactory execution of the special processes i.e. welding, soldering, NDT etc, the item/ material/ documentation will be affixed with the appropriate stamp/ tag at an identified location. While the design of stamp shall take into consideration easy identification of the process/area of activity, use of rubber or metallic stamps shall be decided accordingly.

Affixation of stamp on the item/ material, when required, shall be in addition to the certification in appropriate column of inspection documents.

14. PRODUCTION PERMITS AND CONCESSIONS

14.1. A PRODUCTION PERMIT is permission granted by the Regional Director/ Resident Officer-In-Charge, DGAQA to manufacturer, in advance of manufacture, to use materials or to make components or stores which differ from the approved drawings or specification. This permission is operative for a limited quantity and/or period.

14.2. A CONCESSION is permission granted by the Regional Director/ Resident Officer-In-Charge, DGAQA to a manufacturer to use or release a limited quantity of material, components or

stores already manufactured but not complying strictly with the approved drawings or specification or SOP.

14.3 Each request for a Production Permit or Concession is to be submitted in writing by the Firm's Approved Head of Quality Department /authorised representative to the Regional Director/ Resident Officer-In-Charge, DGAQA as per the format given in ***IMTAR -21 version 2.0.*** It will be dealt with, in accordance with the instructions on the subject given in ***IMAP-23***. When the need for a Production Permit or Concession arises at a Sub-Contractor's Works, the acceptance of the products by the Main Contractor, must also be in co- ordination with Regional Director/ Resident Officer-In-Charge, DGAQA.

14.4 There will be provision for Periodical Review of production permits/concessions granted by DGAQA vis a vis the performance of such products/services during exploitation.

14.5 In case of organisations not having resident office of 'DGAQA', the procedure remains same except that in all such instances, respective Regional Director/Officer-in- Charge nominated by HQrs DGAQA or /Headquarters DGAQA, New Delhi will be the nodal centre to be approached for appropriate disposition.

15. DEFECT INVESTIGATION OF PREMATURE FAILURE OF PRODUCTS RELEASED BY MAIN CONTRACTOR

All premature withdrawals as well as customer complaints of products/ services released by the main contractor including the ones involving incidents/ accidents shall be required to be investigated for finding root cause so as to take corrective/ preventive measures both at factory as well as at user end, if applicable.

Periodic review of recommendations of such investigations will form part and parcel of the quality assurance system.

SECTION - III

APPROVAL OF FIRM'S QUALITY ASSURANCE PERSONNEL

1. REQUIREMENTS

Corporate Quality Head Approval: A person (not below the rank of General Manager/ ED/ Board of Directors level) formally appointed as Corporate Quality Head of the organisation with executive authority and responsibility to direct and control all QA / QC activities independently. His/ Her assignment shall not have functions/ activities other than Quality Function to avoid conflict of interest. He/ She will be considered eligible for DGAQA approval subject to meeting the following requirements:

a***) Qualifications – Minimum graduate in engineering/ preferably post graduate/ doctoral in relevant engineering for core engineering industries. Minimum Post graduate in science for specialized sector like refineries/chemical laboratories.***

b) Experience- Managing Quality Functions for minimum Eight years, out of which at least five year at senior level (DGM and above) in Quality department.

c) Training: Trained / Certification courses on Aerospace QMS Requirements, Aerospace Recommended Practices, Quality Tools etc.

He/ She shall be the authorised official for communication with DGAQA HQ for matters related to Quality. All correspondence in this regard shall be signed and released by the Corporate Quality Head. During the absence of the Approved Quality Head for more than a month, the highest corporate authority shall nominate a suitable replacement meeting the criteria of qualification/ experience/ training/ recommendations as stipulated above and communicated to DGAQA for approval.

1.1 Quality Head Approval: A person formally appointed by the corporate/ management of the organisation as Quality Head of Business Unit/ Division/ Entity with executive authority and responsibility to direct and control all QA / QC activities independently. His/ Her assignment shall not have functions/ activities other than Quality Function to avoid conflict of interest. He/ She will be considered eligible for DGAQA approval subject to meeting the following requirements:

a) Qualifications – Minimum graduate in engineering/ preferably post graduate/doctoral in relevant engineering for core engineering industries. Minimum Post graduate in science for specialized sector like refineries/chemical laboratories.

b) Experience- Minimum three years at senior level and total five years in Quality Functions.

c) Training: Trained / Certification courses on Aerospace QMS Requirements, Aerospace Recommended Practices, Quality Tools etc.

d) Recommendations from the Organisation's Corporate Quality Head.

He/ She shall be formally approved by DGAQA as Quality Head for the relevant Business Unit/ Division/ Entity based on the recommendations of the concerned RD/ HOE and ADG. All QA/ QC personnel of the Business Unit/ Division/ Entity shall be under the direct functional and administrative control of the Approved Quality Head. In addition to ensuring compliance with QMS requirements stipulated by DGAQA from time to time, he/ she shall be responsible to DGAQA for ensuring that only accepted store are released and allowed to use / install on the aircraft / aero-engine/ Assembly- sub assembly / details parts etc.

He/ She shall be the authorised official for communication with DGAQA for matters related to Quality. All correspondence in this regard shall be signed and released by the Approved Quality Head. During the absence of the Approved Quality Head for more than a month, the head of the Business Unit/ Division/ Entity shall nominate a suitable replacement meeting the criteria of qualification/ experience/ training/ recommendations as stipulated above and communicated to the concerned Regional Office of DGAQA for further action. Absence of Approved Quality Head for a period beyond one month may result in suspension/ withdrawal of the approval granted to the firm.

1.2 Release Note Signatories: A Candidate will be eligible for consideration of DGAQA approval if he/ she meets the eligibility requirements similar to Quality Head. Approval to Release note signatories normally will be limited to three i. e. Quality Head, Deputy Quality Head and one additional personnel at similar level of Dy Quality Head.

1.3 Test Lab Signatories (Test Laboratories): All test report shall be issued by a competent person approved by DGAQA as Test Lab signatory. He/ she shall be directly reporting to the head of Quality Department. A candidate will be eligible for consideration of DGAQA approval, if he /she meets following criteria

a) Qualifications - Minimum graduate in engineering/ preferably post graduate/ doctoral in relevant engineering for core engineering industries. Minimum Post graduate in science for specialized sector like refineries/chemical laboratories.

b) Experience- Minimum three years at senior level and total five years in Test Laboratory Functions

c) Training : Trained / Certification courses on Test Laboratory and special process accreditation requirement like NABL, NADCAP, AS9100, ASNT/ ISNT etc.

Note : Experience requirement for Alternate / Deputies is three years and other requirement remain same.

1.4 Inspector Approval

A Candidate will be eligible for consideration of approval only if he/she meets the following criteria:-

1.4.1 GENERAL

a) Has completed 19 years of age.

b) Has passed Diploma in Engineering (for core engineering industries)/ Degree in science for refineries and chemical laboratories. This may, however, be relaxed in the case of candidates with ***ITI + Minimum 10 years experience.***

c) Is a permanent employee of the organization.

d) ***Tenure based employment on permanent company roll may be considered subjected to fulfilment of the requirement mentioned for Inspector Approval. They should have minimum six months training in QC/QA with adequate training & OJT. They should be deployed for non critical & GSE stores for initial one year and based on performance may be considered for Mission critical & flight critical stores.***

e) Shall be medically fit and meet following vision requirements (with or without glasses) for each eye

Distant Vision	Near Vision	Colour Vision
6/9	SN 0.6/N6	Normal

Note: The periodicity for Vision Test shall be once a year for those working in Metrology, Laboratory (both Captive lab/ Test house) and Non-Destructive Testing areas and once in two years for others.

f) A degree in Science (B.Sc) or Diploma in Engineering will be considered equivalent.)

1.4.2 TECHNICAL

1.4.3 Requisite minimum technical experience in the relevant is given in the table appended below field which may include apprenticeship with an approved firm or Government Organisation and / or Government Training Scheme etc. In case of existing inspection personnel who are already approved by DGAQA in other areas of work, a minimum of six months inspection experience is required in the area of scope for which approval is sought. The staff shall be deployed to appropriate areas based on their qualification and experience in the respective field.

Qualification	**Minimum Experience**		
	General Engineering	**Aircraft Industry**	**Category in which approval sought**
Diploma in Engineering (In relevant branch)	3 Years	2 Years	6 Months
Degree in Engineering (In relevant branch)	2 Years	1 Years	6 Months

1.4.4 Ability to read and interpret drawings, specification and other technical documents.

1.4.5 Adequate knowledge of measuring instruments, gauges and test equipments.

1.4.6 Conversant with the relevant inspection procedures, instructions and specifications issued by the concerned authorities.

1.4.7 Not less than one year inspection experience including training period, if any, in the field of quality for provisional approval, depending upon the approval sought, in their respective field of inspection. He/ She should also have knowledge on inspection/ quality standards being followed currently and undergone structured training programme for minimum two weeks (96 hrs) in respective field of aerospace inspection and manufacturing processes before seeking DGAQA approval/renewal. ***DGAQA shall be overseeing the Inspector training program as an observer.*** The following topics shall be covered in the training.

- Introduction to military aviation: General awareness about the military aviation, terminology used in aerospace, safety requirements, Foreign Object Damage (FOD), shelf life policy of aviation stores, Military Specifications etc.
- Quality Management System & QC tools: Basic concept of aerospace QMS requirements, First Article Inspection requirement and other quality tools etc.
- Principle of measurement: Basic concepts of measurement in respective field (Mechanical, Electrical, Avionics, etc), limits, fits, tolerances, standards symbols and its interpretations.
- Definitions and interpretations: Definitions and interpretation of various technical terms, geometrical parameters used in day to day inspection like inspection, repeatability, reproducibility, accuracy, precision, calibration, measurement errors, uncertainty, measurement system analysis etc.
- General Measuring Instrument: General introduction, care during daily uses, calibration and permissible errors for measuring instrument.
- Special measuring equipment: General introduction, care during daily uses, calibration and permissible errors for special measuring equipment.
- NDT technique: General introduction, working principle, area of application of various NDT methods like DPT, Magna flux, Eddy current, ultrasonic etc.
- Testing stands / Rigs/fixtures/ trolleys covering the general introduction, care during daily use; calibration for various type of test stands used like hydraulic test stands, pneumatic test stands etc.
- Manufacturing Processes: General introduction to machining, fabrication, welding, riveting and heat treatment of aerospace grade materials like titanium, steel, aluminum, and its alloys and common defects.
- Rubber and non-metallic parts: Inspection, testing and manufacturing process for non- metallic parts of aerospace grade and common defects

- ❖ Fuel Oil and Lubricants : Inspection, testing and manufacturing process for fuel oil and Lubricants of aerospace grade and common defects
- ❖ Role of DGAQA: It may cover basic introduction about DGAQA. Inspection / QA activities which required DGAQA acceptance/ clearance / coordination and defect management system.
- ❖ Regulatory Documents: It may cover the basic introduction to AFQMS, ***IMAP-23, IMTAR 21 V2.0*** and relevant QASP documents of the firm.

1.4.8 In areas of sophisticated technology, the personnel of higher qualification, more experience and specialized training may be needed for verification activities.

1.4.9 Personnel involved in NDT testing shall have valid NDT-Level-II (minimum) for issue of test report and level-III for approving the Test plan/ procedure for NDT test. It should be from recognised institution i.e ASNT/ISNT.

2. PROCEDURE

2.1 The DGAQA approved Head of Quality of the Firm, will forward the application of his Quality Control/Assurance Personnel under defined category as per appendix "C" for approval to the Regional Director/Resident Officer-In-Charge, DGAQA, , giving the following details :-

2.1.1 NAME :

2.1.2 DESIGNATION:

2.1.3 EMPLOYEE/ STAFF NUMBER:

2.1.4 STAMP NUMBER

2.1.5 DATE OF BIRTH :

2.1.6 ACADEMIC QUALIFICATIONS:

2.1.7 PROFESSIONAL /TECHNICAL QUALIFICATIONS:

2.1.8 EMPLOYEMENT WITH THE PRESENT EMPLOYER:

2.1.9 TRAINING DETAILS ***(Including 96 hrs. & refresher training)*** WITH DATES:

2.1.10 EXPERIENCE IN YEARS/MONTHS

(A) TOTAL

(B) SPECIALIZATION IF ANY

(C) INSPECTION

(D) IN CATEGORY FOR WHICH APPROVAL IS SOUGHT

2.1.11 SHOP / PROJECT

2.1.12 CATEGORY OF APPROVAL REQUESTED INCLUDING EXISTING APPROVAL (IF ANY)

2.1.13 ACHIEVEMENTS IN QUALITY CONTROL

2.1.14 STRENGTH & WEAKNESS

2.1.15 INSPECTION LAPSES/ FAILURE REPORTED ON PART OF INSPECTOR IN LAST THREE YEARS (IF ANY)-

2.1.16 ADDITIONAL INFORMATION, IF ANY

2.1.17 SIGNATURE OF THE INSPECTOR WITH NAME AND DATE

2.1.18 COUNTER SIGNED BY THE HEAD OF QUALITY WITH STAMP AND DATE

2.2 Eligible candidates will be required to appear for an interview before the approval board constituted by Regional Director/ Resident Officer-In-Charge, DGAQA. The board shall include a member of the Firm's Quality Assurance Organisation also.

2.3 A candidate who has failed to satisfy the Board will be permitted to re- appear for re-examination after a minimum period of six months from the date of declaration of results. However, exceptional cases may be considered by respective RDAQA after 3 months in case of recommendation of the same by the Quality Head of the organisation.

2.4 Approval may be granted to an inspection staff to cover more than one scope of inspection at a time subject to his/ her fulfilling the necessary requirements for each of such areas. Such cases will be considered more as exception and not as a routine. Personnel approved by the board with specified scope of approval will be issued approval stamps uniquely identified by head of quality, under intimation to resident DGAQA office.

2.5 Validity of approval will be for a period of three years subject to the conditions as stipulated in the approval letter by respective DGAQA office. However, inspection personnel already approved and waiting for revalidation after expiry of three years, may continue to be having approval status for the scope in which they are approved till such time the revalidation is declared subject to the renewal request received in DGAQA office 45 days before the expiry of current approval. DGAQA office will process the approval request within 30 days from the date of receipt duly completed in all respect.

2.6 Refresher Training for Approved Inspection Staff: Approved inspection personnel shall be subjected for refresher training once every two years from the date of initial approval. Curriculum for such training shall cover topics such as: Amendments to Quality Assurance Procedures, Changes in the organisation, changes to manufacturing and inspection documents/ quality directives, review and analysis of defects, non-conformance observed during internal and external audits, current technology trends, DGAQA Regulations, Directives, changes/ amendments to existing regulations. Exhaustive audit reports may be taken-up as case studies during the refresher training.

3. SUPERVISION

3.1 The Firm's Head of Quality will in the first instance, submit a complete list of their QA personnel to the Regional Director/Resident officer In-Charge, DGAQA. Any additions, changes in assignment or termination of personnel approved by DGAQA shall be informed to DGAQA immediately and updated on quarterly basis.

3.2 The Head of Quality of the Firm will apprise DGAQA of any serious lapse in inspection on the part of his QA personnel. Approval of an inspector is liable to be withdrawn by DGAQA with suitable annotation in approval records if serious lapses/ repeated failures are noted against him/her.

3.3 ***Approval withdrawn shall hold and restrict an inspector from all inspection activities for a period of minimum 6 months. Post completion of aforesaid period, Head of Quality may propose for granting approval again submitting documents necessary to establish the course of correction the individual has undergone. In case of affirmation, the grant of inspector approval process shall be taken up as per para 2 above.***

3.4 Approval Cards in triplicate to cover each approved person (refer appendix "D") will have to be raised by the firm and forwarded to the Resident officer In Charge / HQ DGAQA for scrutiny and Issuance. Two cards will be returned to the Head of Quality (One for department record and one for inspector) of the firm concerned and one will be retained by the Resident officer in Charge / HQ DGAQA. In the event of any change in assignment, posting to outside station or superannuation of service, the approval card will be sent to RDAQA/Resident officer In-charge / HQ, DGAQA for appropriate annotation. In such cases the inspection Stamp allotted to the concerned inspection staff shall be withdrawn by the Head of Quality of the Approved Firm and the same shall be mutilated/defaced including additional inventory of the stamps in custody. Further this stamp number shall not be allotted to other inspection personnel. The actions thus taken shall be intimated to DGAQA. Proper records shall be maintained in this regard.

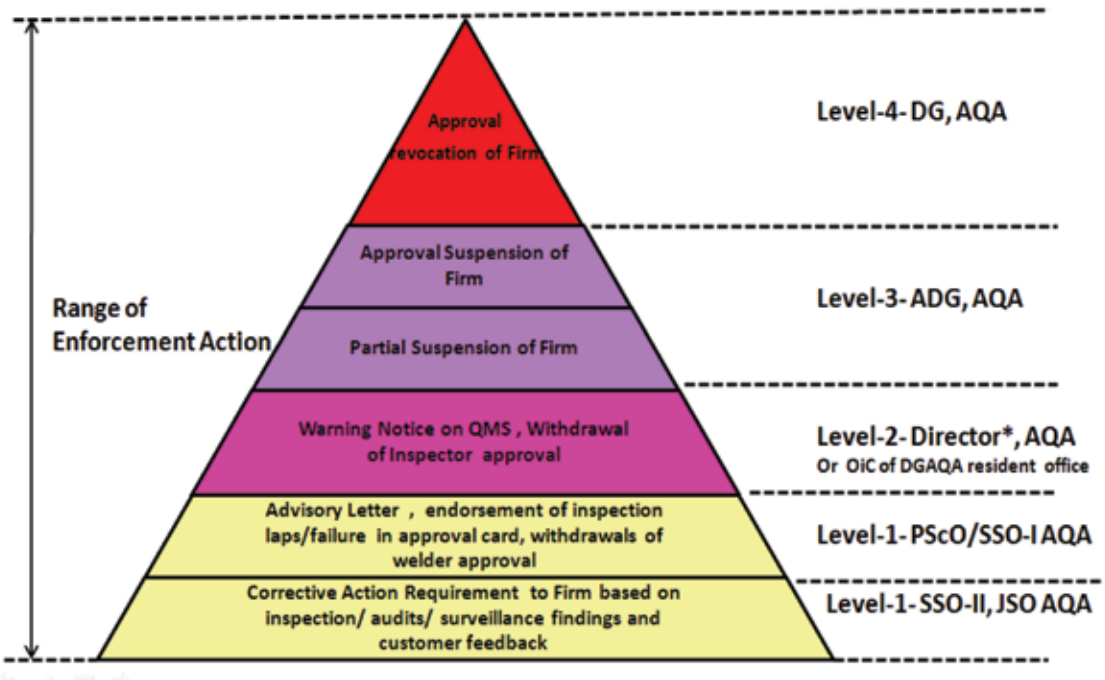
3.5 There shall be a periodic / Quarterly meeting between Head of DGAQA office and Head of Quality along with all process owner of the firm to review the quality issues. ***All the liquefiable concessions, defect investigation, Production permits/Concessions, Non conformances to be reviewed in QRM.*** Record of such meetings will be maintained by the Firms Quality Department and DGAQA office.

4.0 ***Enforcement actions:*** To promote the highest level of Quality and compliance with regulatory standards/ directives/, the DGAQA is implementing risk based assurance management system. DGAQA believes that its compliance philosophy, supported by an established Quality and safety culture, is instrumental in ensuring both compliance with regulations / directives / guidelines and the identification of hazards and management of risk. When deviations from regulatory standards / directives/ guidelines/ do occur, the DGAQA's goal is to use the most effective means, to return an individual or entity that holds an AFQMS approval to full compliance and to prevent recurrence.

DGAQA recognizes that some deviations arise from the factors such as flawed procedures, simple mistakes, lack of understanding, or diminished skills. DGAQA believes that deviations of this nature can most effectively be corrected through root cause analysis and training,

education or other appropriate improvements to procedures or training programs for regulated entities, which are documented and verifiable to ensure effectiveness. However, reluctance or failure in adopting these methods to remediate deviations or instances of repeated deviations might result in enforcement actions.

DGAQA may initiate following enforcement actions as and when considered necessary.



4.1 ***Corrective Action Requirement (CAR):*** DGAQA will communicate CAR arising from inspection/audits/ surveillance finding and customer feedback in writing. The Quality Head shall be responsible for providing documentary evidence that the actions have been completed and, where necessary, a CAR Action Plan that must be agreed with the DGAQA.

4.2 ***Advisory Letter:*** An Advisory Letter will set out the detail of a non-compliance with quality requirements/ conditions stipulated by DGAQA, or of an event or course of events, that raises the concern of the DGAQA in the area of Flight Safety. The letter will set out the full details of the non-compliance, the required outcome and associated timeline. The Quality Head shall be required to demonstrate compliance and, if appropriate, produce an Action Plan to deliver future compliance.

4.3 ***Withdrawal of Inspector /welder approval:*** In case of serious quality/ inspection lapses or repetitive failure (similar lapse two or more times) noticed against inspector / welder, DGAQA may withdraw the approval with suitable annotation in the approval card.

4.4 ***Warning Notice:*** A Warning Notice is more formal than an Advisory Letter and will be issued to the Head of the Division where there has been an unsatisfactory response to an Advisory Letter, or the non-compliance is significant enough to warrant such action as an initial response. A Warning Notice will be issued where clear and identifiable evidence shows that a non-compliance of the quality requirement or conditions stipulated by DGAQA has, or may, occur, but the risk to flight Safety judged by DGAQA, is such that it does not

merit the variation, suspension or revocation of the relevant approval/Endorsement. Following the issuing of a Warning Notice, it may be appropriate to draw up an Action Plan that must be agreed with the DGAQA.

4.5 ***Partial suspension / withdrawal of approvals (Approval Variation):*** Where clear and identifiable evidence demonstrates a non-compliance with quality requirements/ condition stipulated by DGAQA or an approval, and the non-compliance is judged to present a material risk to flight Safety, the DGAQA may initiate Partial suspension/withdrawal of an Endorsement/Approval until the Head of the Division has demonstrated compliance and/or a satisfactory reduction of risk to flight Safety. Following the issuing of an endorsement/approval variation, it may be appropriate to draw up an Action Plan that must be agreed with the DGAQA.

4.6 ***Endorsement/Approval Revocation:*** Where clear and identifiable evidence demonstrates a non-compliance with the quality requirements/condition stipulated by DGAQA or an approval, and the noncompliance is judged to present a high risk to Flight Safety, the DGAQA may revoke an Endorsement/Approval. When determining whether to revoke an endorsement / approval, the DGAQA will consider all relevant factors, such as compliance history and the ability of the Head of the Division to rectify the non-compliance. The DGAQA may also consider submitting a formal letter to the chain of command, or head of the organization, outlining any personal professional failing. Reinstatement of an approval following its revocation will be required and organization will need to repeat the application process.

4.7 ***Control and Record of Enforcement Actions:*** Each enforcement action issued by DGAQA should be assigned a unique number in X/Y/Z/NNN/DDMMYY format. Where X- DGAQA, Y- HAL,Z- level of enforcement action like L1,L2 etc, NNN- Running serial number i.e 001 to 999 for Production Year followed by date & month of issue. The entry shall be made in the Enforcement Action Register which shall be maintained by concerned FEs of DGAQA. All such enforcement actions shall be intimated to HQrs DGAQA. As an example for allotting unique number for level-1 enforcement action at HAL (AMD) by OADG(NK) on 28th July 2017 will be OADG(NK)/ HAL(AMD)/L-1/009/28072017. Here 009 indicate the 9th enforcement action for the current production year.

4.8 ***Appeal process:*** If not satisfied, the firm granted the AFQMS approval by DGAQA may appeal with in thirty days against the enforcement action imposed by DGAQA as under:

4.8.1 Appeal against Level-1 & Level-2 enforcement action will be heard by Concerned Additional Director General. If the matter remains unresolved for thirty days from the date of request, a further appeal may be made to Director General, AQA.

4.8.2 Appeal against Level-3 enforcement action will be heard by a committee at HQrs DGAQA chaired by DG, AQA with ADG, HQrs and Concerned Director at HQrs as members.

4.8.3 An appeal against Level-4 enforcement action may be made to the Secy (DP) MoD.

4.9 The outcome of the appeal process will be communicated to the firm by DGAQA.

5. REFERENCE VIOLATIONS

In addition to para 4 above, violations observed are categorised as under for initiation of regulatory/statutory proceedings:

5.1 Level 1 Violations: Procedural Violation which includes: Escapes in Step to step getting involvement of Certification and GQA agency, non conduct of periodical review meetings such as DI review committee meeting. Non conduct of periodical Internal Audits, non-invite or facilitation for Quality Audits. Non conduct of quality reviews, RCAs for product non conformities and implementation of CAPA. Non availability of technical Instructions/procedures. Quality Escapes etc.

5.2 Level 2 Violations: Violation that includes Non adherence to technical validation procedure, violation of drawing office procedures, Traceability gaps, Use of un-authorised components/parts/consumables, Use of parts from unauthorised source, variations/ deviations/NCs related to workmanship not reported by self/workmen, Furnishing incorrect entries in the inspection records, Not ensuring completeness of records, wrongful utilisation of inspection stamp outside the scope of approval, unauthorised use of Inspection stamp. Non-adherence to the technological procedure. Non adhrerence of design change procedure. Change of source of supply of parts/components without approval. QC attestation without ensuring completion of Documents/records or the technical activity.

5.3 Level 3 Violations: Violation that includes Non adherence to technical requirements, use of non qualified/calibrated gauges and equipments, Un authorised work on Aircrafts/ components/parts, Un authorised change in documents and records, Generation of forged technical documents/records, Un-authorised changes to the Configuration, Un-authorised Manufacturing Process change , Non record keeping of deviation/variation/ NCs, production walkahead despite evident technical non-compliance at the stage, use of non-validated(un-proven) parts/components. Non-adherence /alterations to the process requirements such as selant curing, time temperature requirements, Paint curing requirements etc. Use of un-approved Test equipments, tools, jigs and fixtures.

5.4 Level 4 Violations: Willful defaults which includes Use of non-conforming parts or life expired material/parts, submission/presentation of false or forged or morphed reports, Denial access for audits/ surveillance/investigation/collection of evidence or samples, willful neglect of deviation/variation/NCs, production walkahead with an attempt to hide NCs, Production walkahead despite company QC or DGAQA hold, Un-authorised changes to the design in order to accomodate or regularise production deviation/ NC. Production walkahead bypassing Quality validation tests/checks. Willful defaults against all previous violations categories which excludes cautious violations duly informed to TAA alongwith risk mitigation plan and subjected to necessary validation in coordination with TAA.

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APPENDIX – A

FORMAT OF APPLICATION FOR GRANT OF APPROVAL/RENEWAL BY DGAQA TO A FIRM & ITS QUALITY MANAGEMENT SYSTEM

Part-I – (To be completed by Main Contractor)

1. Para 2.2 of Section I General Conditions" refers.

i) Name of Firm with complete address of the work centre(s)

ii) Head of the Division formally appointed by the Corporate Management of the firm- Provide copy of duties and responsibilities assigned

iii) Total Number of employees (Permanent, Temporary, and contractual) with detailed organisation chart

iv) Total number of QC personnel with detail QCD organisation chart

v) List of manufacturing facilities relevant to the contract/order available.

vi) List of Inspection / Testing facilities and equipment available

vii) Installed Production Capacity for the scope of approval (If applicable)

viii) Name, Qualifications & experience of Head of Quality **& Deputy Head of Quality.**

ix) **Name, Qualifications & experience of Release Note, Additional Release Note Signatory & Test report signatory.**

x) List of QA personnel indicating qualification, discipline and experience in the requisite field.

xi) Approval of the firm in the following categories (delete categories not applicable) :

a) Design & Development/ Manufacture / overhaul / repair agencies of Aircraft, Engines, Missiles, Electrical and Electronic Equipment, Instruments etc., and their components / accessories or Aircraft materials. ***(As per category mentioned in Para 3.1.4 Note Part-I, Section-I of AFQMS-Issue III: 2024).***

b) Process workshops, (Protective Treatment, Heat Treatment, Plating, Surface Treatment etc.)

c) Stockist of the above, for Certification that they are re-consigning parts or materials received from approved sources in the condition in which received.

d) Test houses or Laboratories for testing to specific requirements / specifications.

e) Any other category not listed above

viii) List of special processes involved availability of technology & trained manpower.

ix) Details of previous supply orders executed and current supply order.

2. Please provide details of other approvals held.

a) Third Party Approvals against national/international standards e.g. AS 9100, ISO 9000 series, ISO 14000 etc.

b) Approvals from external agencies/organizations such as Boeing, British Aerospace, Rolls Royce etc along with their scope of approval.

c) Approval from national agencies/organizations such as DGCA, ISRO, BARC, ADA, DRDO etc.

Part-II- Certification by ***Head of*** Quality.

It is hereby certified that self assessment has been carried out as per DGAQA AFMQS document and “Organisation Name” is meeting all requirement stipulated in the AFQMS.

(Signature of the **Head of** Quality)

with Stamp and date

Part-III- Certification by Head of the Division

I hereby certified that above information are correct to the best of my knowledge and “Organisation Name” is having all the resources, competency & capacity for the scope for which DGAQA approval is sought. Under the AFQMS approved firm, I shall be accountable to DGAQA for continuous compliance of AFQMS requirement and other directive / instruction issued from time to time by DGAQA.

(Signature of the Head of the Division)

with Stamp and date

Part-IV- Recommendation of respective Regional Director/Officer-in- Charge /Group Director at Headquarters DGAQA

It is certified that Quality System Audit of the firm has been carried out as per AFQMS requirement and Non-Conformance observed during the audit have been intimated to the firm and closed as per action plan agreeable to DGAQA.

The firm is recommended / Not-recommended for AFQMS Approval / Renewal.

(Signature of RDAQA)

with Stamp and date

Part-V- Recommendation of respective ADG/ ADG (HQrs), DGAQA with Pen Picture of the firm iro commitment of Top Management towards Quality.

(Signature of ADG, DGAQA)

with Stamp and date

3. Copy of Completed application giving the above details is to be forwarded to HQrs DGAQA at address appended below through respective DGAQA Resident office/ Group Director at HQrs:

DIRECTOR GENERAL
DIRECTORATE GENERAL OF AERONAUTICAL QUALITY ASSURANCE ***(DGAQA)***
GOVT. OF INDIA, MINISTRY OF DEFENCE
7th FLOOR 'A BLOCK', DEFENCE OFFICE COMPLEX
KG MARG, NEW DELHI – 110 001.

AFQMS(F-1002) | 2024

APPENDIX – B

AUTHORIZED RELEASE NOTE CERTIFICATE

<table>
<tr><td colspan="2">1. DGAQA Approval Ref No

Dated :
Valid up to :</td><td colspan="5">2. AUTHORIZED RELEASE NOTE CERTIFICATE
DGAQA Form AFQMS (F) - 1002</td><td>3. Release Note No:</td></tr>
<tr><td colspan="3">4. Consignor Organization Name and Address:</td><td colspan="4">5. Consignee Name and Address:</td><td>6. Supply Order/Contract / Wok Order Number:</td></tr>
<tr><td rowspan="2">7. Item:</td><td rowspan="2">8. Description:</td><td rowspan="2">9. Part Number:</td><td rowspan="2">10. Specification</td><td colspan="4">11. Quantity:</td><td>12. Identification mark of Inspector’s Inspection stamp</td></tr>
<tr><td>Qty on order</td><td>Acct. Unit</td><td>Qty Tender</td><td>Qty Accepted</td><td>Total Qty Accepted Till date</td><td>13. Package, Marking & Remarks</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="9">14. This certificate is issued under the approval granted by Director General of Aeronautical Quality Assurance, Ministry of Defence, Govt. of India, New Delhi. It is certified that whole of the above mentioned material/goods/components manufactured/ repaired/overhauled/ serviced, have been inspected and tested as per approved drawings/specifications and unless otherwise stated, confirm in all respect to the specifications in the contract/ order referred.

Verified by
(Approved Inspector)
With name, inspection stamp and date

(Authorised Release Note Signatory)
With name, stamp and date</td></tr>
<tr><td colspan="9">User/Installer Responsibilities</td></tr>
<tr><td colspan="9">It is important to understand that the existence of this document alone does not automatically constitute authority to install the article on aircraft/ aero-engine/ System.</td></tr>
</table>

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APPENDIX – C

CATEGORY OF INSPECTOR APPROVAL

Main Category	AIRCRAFT(A)/ HELICOPTER(H)/ALM(Mi)/ ALB(B)/UAS(U),	AERO ENGINES (E)	ANCILLARY EQUIPMENT/ SYSTEM (AE)	MISCELLANEOUS (M)
Type of Activities	D-Design &Development, M- Manufacturing, O-Overhaul/Installation/ Repair/ Service	D-Design & Development, M- Manufacturing, OP-Overhaul/Repair/ Service-Piston Engine, OJ-Overhaul/Repair/ Service-JET Engine	D-Design & Development, M-Manufacturing, O-Overhaul/Installation/ Repair/Service	M-Manufacturing, O-Overhaul/Installation/ Repair/Service, T-Test Lab
Sub Category	1. Armament 2. Cable and ***Looming*** 3. Electrical & ignition system 4. Flight Control System 5. Fuel & Oil System 6. Hydraulic & pneumatic system 7. Instruments 8. Power Plant (i) Installation and rigging (ii) Engine Run Up and Field Service 9. Radio, Radar 10. Safety & escape systems 11. Structural Components (i) ***Metallic*** (ii) ***Composite*** 12. ***Structural Assembly*** 13. Undercarriage System 14. DI of Aircraft	1. Accessories 2. Engine Testing 3. Inhibition, Protective Treatment and Packing 4. Major Components 5. View Room	1. Automatic Pilots (a) Electric (b) Electronic (c) Hydraulic 2. Battery 3. Electrical Instruments 4. Fire Extinguishers 5. Mechanical Accessories 6. Mechanical Instruments 7. Oil cooler &Radiators 8. Propellers &CSU 9. Radio and Radar Equipment 10. Tank-Rubber & Metal 11. Turrets, Guns and Armaments	1. Bearings 2. Calibration and Metrology 3. ***NDT*** (i) ***UT*** (ii) ***DPT*** (iii) ***Radiography*** 4. Fabric Work 5. Finishing 6. Foundry 7. ***Fuel, Oil, Lubricants & Gas*** 8. Heat Treatment 9. Jigs & Tool Room 10. GHE/GSE/TTGEs 11. Machine Shop 12. Pattern Shop 13. ***Rubber & Plastics*** 14. Protective Treatment 15. Quality Engineering – QMS documentation iro of Approvals, Management Reviews, Audits, Defect Investigation, PDOs etc 16. Scrutiny and vetting of Quality documents i.e drawing, specification, QTP/ ATP etc 17. Sheet Metal 18. Stores 19. Test Laboratory 20. Welding
Stamp number	**Example:** A QC personnel of HAL(AMD) having Empl ID number 10712, approved for structural component of Airframe category in manufacturing may have the approved stamp number as			HAL (AMD) Empl. ID 10712 AM11
	Note: Any other category not listed above may also be added on need basis			

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APPENDIX – D

INSPECTOR APPROVAL CARD FORMAT

APPROVAL/ RENEWAL

Approval/ Renewal letter no of DGAQA	Category No / Scope of Approval	Date of Issue	Valid up to	Signature of Approving DGAQA Authority	Remarks

NON-COMPLIANCE

SN	Date	Details of Non-Compliance	Action Taken	Signature of Shop QC In-charge	Signature of RDAQA
1.					
2.					
3.					

Note : Validity of the additional approvals will be same as validity / extended validity of the scope of initial approval.

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APPENDIX – D

FORMAT FOR INSPECTOR/LAB TEST PERSONNEL APPROVAL CARD

INSTRUCTIONS

1. An inspector is authorised to inspect & certify the work falling within the scope of approval only.
2. The inspector shall familiarise himself/ herself with quality manuals, relevant standards/documents, directives etc issued from time to time and adhere to procedure outlined therein strictly.
3. Inspectors must ensure compliance with each and every stipulation of the current issue number of drawings, specification or other governing documents.
4. All inspection lapses/non-compliances attributable to the approved inspector will be entered in the Approval Card by the respective shop inspection in-charge and countersigned by RD, AQA. Approval of the inspector is liable to be withdrawn by DGAQA with suitable annotation in approval records if repeated failures or serious lapses are noted.
5. The approval will automatically stand cancelled, if the approved individual inspector is shifted from the Quality Control Department / transferred to the other division/ superannuated.
6. Stamp issued to the individual inspector is not transferable and must be used strictly by the concerned.
7. All entries of endorsements should be made in this card only by an authorised person.
8. The stamp should be used for the products of Indian Armed Forces only.
9. The approval card shall be kept in good condition and shall be produced for scrutiny on demand.
10. The validity of approval will be 03 years from the date of issue/renewal of the approval

DGAQA Emblem

DGAQA Office Address

INSPECTOR / LAB TEST PERSONNEL APPROVAL CARD

Photo of the Inspector not older than six months

1. Name:
2. Designation:
3. Professional Qualification:
4. Department/ Shop:
5. Employee No:
6. Stamp No:
7. Date of Appointment:
8. Date of Superannuation:
9. Date of Initial Approval:
10. Specimen Signature of the Inspector:

Signature of the Approving Authority with date

AFQMS(F-1005) | 2024

APPENDIX – E

FORMAT FOR WELDER APPROVAL

Date of Renewal	Manager (Inspection)	DGAQA

Note : This is valid for one year from the date of approval/renewal.

INSTRUCTIONS

1. No entries or endorsements should be made in this card except in the manner and the person authorised for that purpose by the DGAQA.
2. If this card is lost, DGAQA office should be informed immediately quoting the card details.
3. Any person finding this card should return it to the DGAQA Office immediately.
4. For renewal, if required, application should be submitted to DGAQA at least four weeks in advance of expiry date.

DGAQA Emblem

DGAQA Office Address

WELDER APPROVAL CARD

Photo of the Inspector not older than six months

1. Name:
2. Designation:
3. Department/ Shop:
4. Employee No:
5. Qualification:
6. Date of Superannuation:
7. Material Category:
8. Welding Group:
9. Welding Process:
10. Date of Initial Approval
    (Initial Approval is valid for 03 months)
11. Approved Certificate/Stamp No:
12. Specimen Signature of the Welder:

Signature of the Approving Authority with date

AFQMS(F-1006 A) | 2024

APPENDIX – F

FORMAT FOR DGAQA CONTROL POINTS (MEMO STAGE)

"NAME OF THE FIRM"

To,
Resident office
DGAQA

Sl No:
Date:
Time:

Aircraft/Engine/System No:

The following Material /Part /Installation/Assembly/Operation /Stage are ready for your inspection as per DGAQA approved QAP Document No. _____ dated _____.

Part-I (To be completed by DGAQA approved inspector of the Main Contractor)

Sl. NO	Part No	Name/Assy/Operation/Stage	Part Sr Nos	Work order	Qty	QAP Stage Reference No. / Remarks

Certificate of Stage Conformance (COSC)

I hereby certify that Material/ Part/Installation/Assembly/Operation /Stage has been fully inspected, tested and confirmed to the approved drawing/ATP and all technology requirements stipulated in relevant approved schedule. Accordingly the accepted Test report (ATR) No. _____ has been generated and placed in the file no. _____. The stage is hereby recommended for your further clearance/ acceptance.

(DGAQA approved QC Rep)
Signature with Date & Stamp

Part-II (To be completed by the DGAQA Rep)

1. Remarks of DGAQA Rep
2. Basis of Acceptance / Clearance
   (Tick as applicable)

COSC	Re-verification

(DGAQA Rep Signature with date & time)
Name & Designation

Note:

a) **Certificate of Stage Conformance (COSC):** DGAQA rep may accord the acceptance / clearance for the stage purely on the basis of the COSC issued by DGAQA approved QC Personnel with request to accord DGAQA clearance. DGAQA is to ensure that approval is valid and for relevant area for QC personnel issuing the COSC.

b) **COSC + Re-verification:** DGAQA rep may accord the acceptance / clearance for the stage purely on the basis of the COSC and re-verification by DGAQA on certain check points of inspection / test report /documents, on random sampling basis. DGAQA rep is to ensure that approval is valid and for relevant area for QC personnel issuing the COSC and parameters / documents re-verified are correct.

Distribution: (To be done by the main contractor)
Original – QCD concerned office, **Second Copy** – Consignee (Internal/external), **Third Copy** – To DGAQA office

AFQMS(F-1006 B) | 2024
APPENDIX – G

FORMAT FOR INSPECTION MEMO OF MAIN CONTRACTOR QC DELEGATED STAGE AS PER MATRIX OF DGAQA APPROVED QAP.

"NAME OF THE FIRM"

To,
Resident office
DGAQA

Sl No:
Date:
Time:

Aircraft/Engine/System No:

The following Material /Part /Installation/Assembly/Operation /Stage is taken up for inspection as per DGAQA approved QAP Document no. _____ dated _____.

Part-I (To be completed by DGAQA approved inspector of the Main Contractor)

Sl. NO	Part No	Name/Assy/Operation/Stage	Part Sr Nos	Work order	Qty	Remarks/QAP Stage No.

Certificate of Stage Conformance (COSC)

I hereby certify that Material/ Part/Installation/Assembly/Operation /Stage has been fully inspected, tested and confirmed to the approved drawing/ATP and all technology requirements stipulated in relevant approved schedule. Accordingly, the accepted Test report (ATR) No. _____ has been generated and placed in the file No. _____. The stage is hereby accepted and cleared for next stage.

(DGAQA approved QC Rep)
Signature with Date & Stamp

PART - II

QUALITY MANAGEMENT SYSTEM REQUIREMENTS

TABLE OF CONTENTS

PART-II

INTRODUCTION

0.1 General

The adoption of a quality management system is a strategic decision for an organization that can help to improve its overall performance and provide a sound basis for sustainable development initiatives.

The potential benefits to an organization of implementing a quality management system based on this Standard are:

a. the ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements;

b. facilitating opportunities to enhance customer satisfaction;

c. addressing risks and opportunities associated with its context and objectives;

d. the ability to demonstrate conformity to specified quality management system requirements.

The process approach enables an organization to plan its processes and their interactions.

The PDCA (stands for) cycle enables an organization to ensure that its processes are adequately resourced and managed, and those opportunities for improvement are determined and acted on.

Risk based thinking enables an organization to determine the factors that could cause its processes and its quality management system to deviate from the planned results, to put in place preventive controls to minimize probability of negative effects and its impacts and to make maximum use of opportunities as they arise (see Clause A.4).

Consistently meeting requirements and addressing future needs and expectations poses a challenge for organizations in an increasingly dynamic and complex environment. To achieve this objective, the organization might find it necessary to adopt various forms of improvement in addition to correction and continual improvement, such as breakthrough change, innovation, and reorganization.

In this Standard, the following verbal forms are used:

- ❖ “shall” indicates a requirement should” indicates a recommendation;
- ❖ “may” indicates a permission;
- ❖ “can” indicates a possibility or a capability.

Information marked as “NOTE” is for guidance in understanding or clarifying the associated requirement.

0.2 Quality Management Principles

This Standard is based on the quality management principles described in ISO 9000. The descriptions include a statement of each principle, a rationale of why the principle is important for the organization, some examples of benefits associated with the principle, and examples of typical actions to improve the organization's performance when applying the principle.

The quality management principles are:

- customer focus;
- leadership;
- engagement of people;
- process approach;
- improvement;
- evidence-based decision making;
- relationship management.

0.3 Process Approach

0.3.1 General

This Standard promotes the adoption of a process approach when developing, implementing, and improving the effectiveness of a quality management system, to enhance customer satisfaction by meeting customer requirements. Specific requirements considered essential to the adoption of a process approach are included in 4.4.

Understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its intended results. This approach enables the organization to control the interrelationships and interdependencies among the processes of the system, so that the overall performance of the organization can be enhanced.

The process approach involves the systematic definition and management of processes, and their interactions, so as to achieve the intended results in accordance with the quality policy and strategic direction of the organization. Management of the processes and the system as a whole can be achieved using the PDCA cycle (see 0.3.2) with an overall focus on risk-based thinking (see 0.3.3) aimed at taking advantage of opportunities and preventing undesirable results.

The application of the process approach in a quality management system enables:

a. understanding and consistency in meeting requirements;
b. the consideration of processes in terms of added value;
c. the achievement of effective process performance;
d. improvement of processes based on evaluation of data and information.

Figure 1 gives a schematic representation of any process and shows the interaction of its elements. The monitoring and measuring check points, which are necessary for control, are specific to each process, and will vary depending on the related risks.

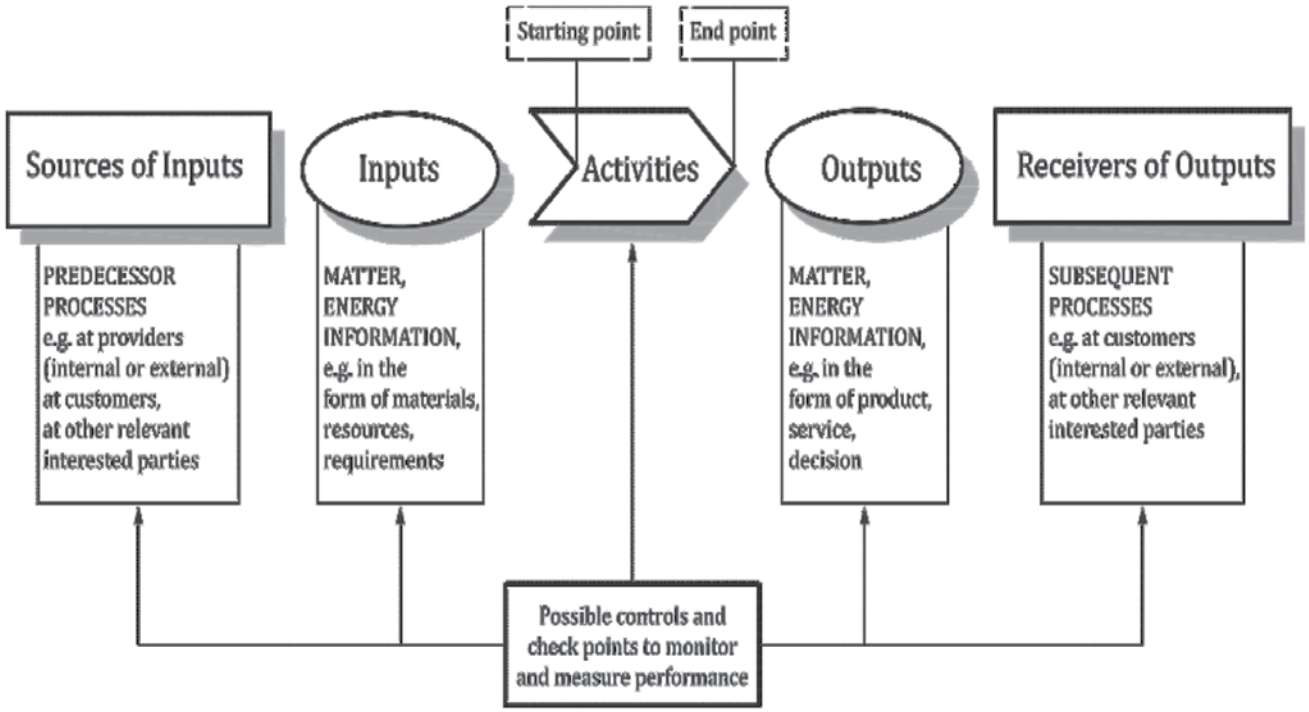


Figure 1 – Schematic representation of the elements of a single process

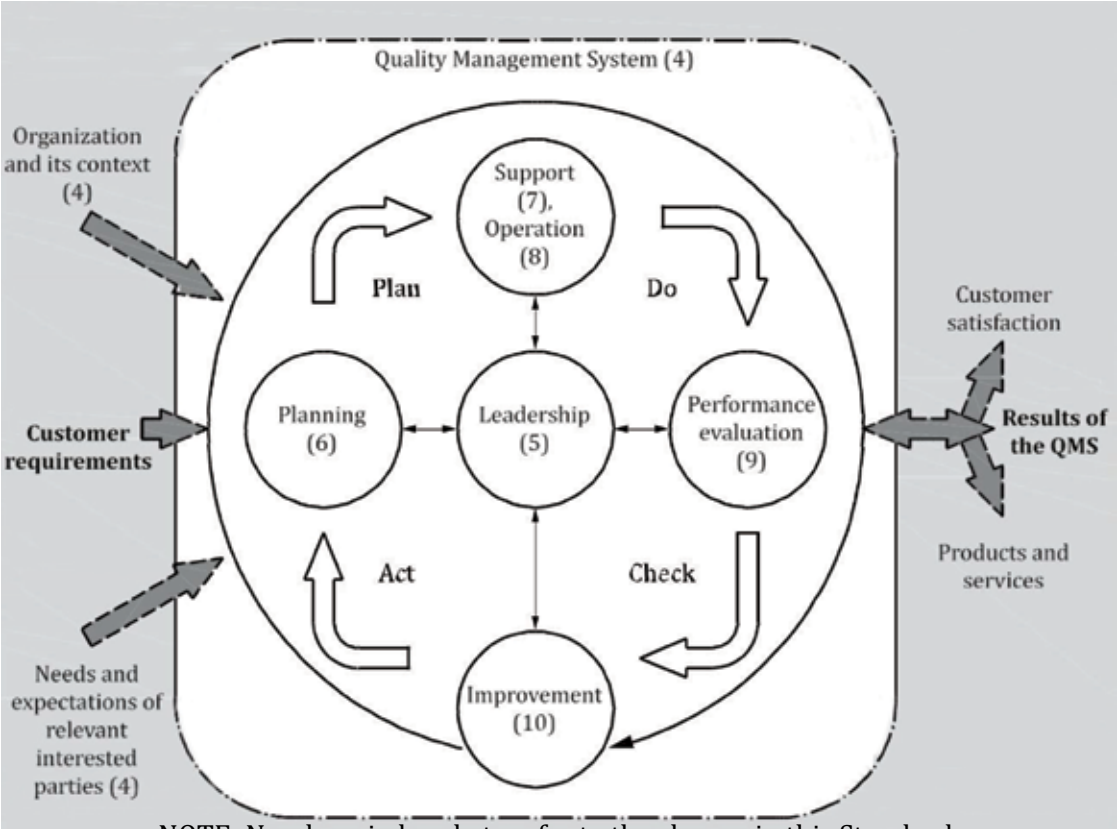
0.3.2 Plan-Do-Check-Act Cycle

The PDCA cycle can be applied to all processes and to the quality management system as a whole. Figure 2 illustrates how clauses 4 to 10 can be grouped in relation to the PDCA cycle

The PDCA cycle can be briefly described as follows:

- Plan : establish the objectives of the system and its processes, and the resources needed to deliver results in accordance with customers' requirements and the organization's policies, and identify and address risks and opportunities;
- Do : implement what was planned;
- Check : monitor and (where applicable) measure processes and the resulting products and services against policies, objectives, requirements, and planned activities, and report the results;
- Act : take actions to improve performance, as necessary.

NOTE: Numbers in brackets refer to the clauses in this Standard.



NOTE: Numbers in brackets refer to the clauses in this Standard.

Figure 2 – Representation of the structure of this Standard in the PDCA cycle

0.3.3 Risk-Based Thinking

Risk based thinking (see Clause A.4) is essential for achieving an effective quality management system. The concept of risk based thinking has been implicit in previous editions of this Standard including, for example, carrying out preventive action to eliminate potential nonconformities, analyzing any nonconformities that do occur, and taking action to prevent recurrence that is appropriate for the effects of the nonconformity.

To conform to the requirements of this Standard, an organization needs to plan and implement actions to address risks and opportunities. Addressing both risks and opportunities establishes a basis for increasing the effectiveness of the quality management system, achieving improved results, and preventing negative effects.

Opportunities can arise as a result of a situation favorable to achieving an intended result, for example, a set of circumstances that allow the organization to attract customers, develop new products and services, reduce waste, or improve productivity. Actions to address opportunities can also include consideration of associated risks. Risk is the effect of uncertainty and any such uncertainty can have positive or negative effects. A positive deviation arising from a risk can provide an opportunity, but not all positive effects of risk result in opportunities.

0.4 Relationship with Other Management System Standards

This Standard applies the framework developed by ISO to improve alignment among its Standards for management systems (see Clause A.1).

This Standard enables an organization to use the process approach, coupled with the PDCA cycle and risk-based thinking, to align or integrate its quality management system with the requirements of other management system standards.

This Standard relates to ISO 9000 and ISO 9004 as follows:

- ISO 9000, "*Quality management systems – Fundamentals and vocabulary*", provides essential background for the proper understanding and implementation of this Standard;
- ISO 9004, "*Managing for the sustained success of an organization – A quality management approach*", provides guidance for organizations that choose to progress beyond the requirements of this Standard.

Annex B provides details of other Standards on quality management and quality management systems that have been developed by ISO/TC 176.

This Standard does not include requirements specific to other management systems, such as those for environmental management, occupational health and safety management, or financial management.

Sector-specific quality management system standards based on the requirements of this Standard have been developed for a number of sectors. Some of these standards specify additional quality management system requirements, while others are limited to providing guidance to the application of this Standard within the particular sector.

QUALITY MANAGEMENT SYSTEMS – REQUIREMENTS

1. SCOPE

This standard includes ISO 9001:2015 quality management system requirements and specifies additional aviation, space, and defense industry requirements, definitions, and notes. *Further additional requirements of DGAQA are shown in italics and underlined.*

It is emphasized that the requirements specified in this standard are complementary (not alternative) to customer and applicable statutory and regulatory requirements.

If there is a conflict between the requirements of this standard and customer or applicable statutory or regulatory requirements, the latter shall take precedence.

This Standard specifies requirements for a quality management system when an organization:

a. needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and

b. aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements.

All the requirements of this Standard are generic and are intended to be applicable to any organization, regardless of its type or size, or the products and services it provides.

NOTE 1: In this Standard, the terms "product" or "service" only apply to products and services intended for, or required by, a customer.

NOTE 2: Statutory and regulatory requirements can be expressed as legal requirements.

2. NORMATIVE REFERENCES

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9000:2015 Quality management systems – Fundamentals and vocabulary

ISO 9001:2015 Quality management systems – Requirements

3. TERMS AND DEFINITIONS

For the purposes of this document, the terms and definitions given in ISO 9000:2015 ***and the following*** apply.

3.1 Counterfeit Part

An unauthorized copy, imitation, substitute, or modified part (e.g., material, part, component), which is knowingly misrepresented as a specified genuine part of an original or authorized manufacturer.

NOTE: ***Examples of a counterfeit part can include, but are not limited to, the false identification of marking or labelling, grade, serial number, date code, documentation, or performance characteristics.***

3.2 Critical Items

Those items (e.g., functions, parts, software, characteristics, processes) having significant effect on the provision and use of the products and services; including safety, performance, form, fit, function, producibility, service life, etc.; that require specific actions to ensure they are adequately managed. Examples of critical items include safety critical items, fracture critical items, mission critical items, key characteristics, etc.

3.3 Key Characteristic

An attribute or feature whose variation has a significant effect on product fit, form, function, performance, service life, or producibility, that requires specific actions for the purpose of controlling variation.

3.4 Product Safety

The state in which a product is able to perform to its designed or intended purpose without causing unacceptable risk of harm to persons or damage to property.

3.5 Special Requirements

Those requirements identified by the customer, or determined by the organization, which have high risks of not being met, thus requiring their inclusion in the operational risk management process. Factors used in the determination of special requirements include product or process complexity, past experience, and product or process maturity. Examples of special requirements include performance requirements imposed by the customer that are at the limit of the industry's capability, or requirements determined by the organization to be at the limit of its technical or process capabilities.

NOTE: ***Special requirements (3.5) and critical items (3.2), along with key characteristics (3.3), are interrelated. Special requirements are identified when determining and reviewing requirements related to the product (see 8.2.2 and 8.2.3). Special requirements can require the identification of critical items. Design output (see 8.3.5) can include identification of critical items that require specific actions to ensure they are adequately managed. Some critical items will be further classified as key characteristics because their variation needs to be controlled.***

4. CONTEXT OF THE ORGANIZATION

4.1 Understanding the Organization and Its Context

The organization shall determine external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system.

The organization shall monitor and review information about these external and internal issues.

NOTE 1: Issues can include positive and negative factors or conditions for consideration.

NOTE 2: Understanding the external context can be facilitated by considering issues arising from legal, technological, competitive, market, cultural, social, and economic environments, whether international, national, regional, or local.

NOTE 3: Understanding the internal context can be facilitated by considering issues related to values, culture, knowledge, and performance of the organization.

4.2 Understanding the Needs and Expectations of Interested Parties

Due to their effect or potential effect on the organization's ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, the organization shall determine:

a. the interested parties that are relevant to the quality management system;

b. the requirements of these interested parties that are relevant to the quality management system.

The organization shall monitor and review information about these interested parties and their relevant requirements.

4.3 Determining the Scope of the Quality Management System

The organization shall determine the boundaries and applicability of the quality management system to establish its scope.

When determining this scope, the organization shall consider:

a. the external and internal issues referred to in 4.1;

b. the requirements of relevant interested parties referred to in 4.2;

c. the products and services of the organization.

The organization shall apply all the requirements of this Standard if they are applicable within the determined scope of its quality management system.

The scope of the organization's quality management system shall be available and be maintained as documented information. The scope shall state the types of products and services covered, and provide justification for any requirement of this Standard that the organization determines is not applicable to the scope of its quality management system.

Conformity to this Standard may only be claimed if the requirements determined as not being applicable do not affect the organization's ability or responsibility to ensure the conformity of its products and services and the enhancement of customer satisfaction.

4.4 Quality Management System and Its Processes

4.4.1 The organization shall establish, implement, maintain, and continually improve a quality management system, including the processes needed and their interactions, in accordance with the requirements of this document.

The organization's quality management system shall also address customer and applicable statutory and regulatory quality management system requirements.

The organization shall determine the processes needed for the quality management system and their application throughout the organization, and shall:

a. determine the inputs required and the outputs expected from these processes;

b. determine the sequence and interaction of these processes;

c. determine and apply the criteria and methods (including monitoring, measurements and related performance indicators) needed to ensure the effective operation and control of these processes;

d. determine the resources needed for these processes and ensure their availability

e. assign the responsibilities and authorities for these processes

f. address the risks and opportunities as determined in accordance with the requirements of 6.1;

g. evaluate these processes and implement any changes needed to ensure that these processes achieve their intended results.

h. improve the processes and the quality management system

These processes shall be managed by the organization in accordance with the requirements of this document. *The objective evidence may include documentation from first, second and/or third party assessment/certification processes that the QMS is compliant with these requirements and is effective. During assessment of AS9100 accreditation/ renewal/ surveillance audits by any certification body, member from DGAQA shall invariably be included as observer from regulatory body.*

4.4.2 To the extent necessary, the organization shall:

a. maintain documented information to support the operation of its processes;

b. retain documented information to have confidence that the processes are being carried out as planned.

The organization shall establish and maintain documented information that includes:

- ***a general description of relevant interested parties (see 4.2 a);***
- ***the scope of the quality management system, including boundaries and applicability (see 4.3);***
- ***a description of the processes needed for the quality management system and their application throughout the organization;***
- ***the sequence and interaction of these processes;***
- ***assignment of the responsibilities and authorities for these processes.***

4.4.3 Quality Manual : The organization shall establish and maintain a quality manual that includes (Para 2.5.1 (vi) of Section-I Part-I also refer)

a. *the scope of the quality management system,*

b. the documented procedures established for the quality management system, or reference to them,

c. a description of the interaction between the processes of the quality management system.

d. Outsourcing procedures covering assessment, approval/ registration, vendor rating & monitoring and Quality Control at sub-contractor's works.

e. procedure for operators assessment and approval

NOTE: *A procedure shall be established in co-ordination with DGAQA and specified in the organization's QMS for issue of Duplicate Certificate/Log Card including OEM supplied documents arising out of their loss or damage.*

NOTE: ***The above description of the quality management system can be compiled into a single source of documented information and referred to as a quality manual.***

5. LEADERSHIP

5.1 Leadership and Commitment

5.1.1 General

Top management shall demonstrate leadership and commitment with respect to the quality management system by:

a. taking accountability for the effectiveness of the quality management system;

b. ensuring that the quality policy and quality objectives are established for the quality management system and are compatible with the context and strategic direction of the organization;

c. ensuring the integration of the quality management system requirements into the organization's business processes;

d. promoting the use of the process approach and risk-based thinking;

e. ensuring that the resources needed for the quality management system are available;

f. communicating the importance of effective quality management and of conforming to the quality management system requirements;

g. ensuring that the quality management system achieves its intended results;

h. engaging, directing, and supporting persons to contribute to the effectiveness of the quality management system;

i. promoting improvement;

j. supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

NOTE: Reference to "business" in this Standard can be interpreted broadly to mean those activities that are core to the purposes of the organization's existence, whether the organization is public, private, for profit, or not for profit.

5.1.2 Customer Focus

Top management shall demonstrate leadership and commitment with respect to customer focus by ensuring that:

a. customer and applicable statutory and regulatory requirements are determined, understood, and consistently met;

b. the risks and opportunities that can affect conformity of products and services and the ability to enhance customer satisfaction are determined and addressed;

c. the focus on enhancing customer satisfaction is maintained;

d. ***product and service conformity and on-time delivery performance are measured and appropriate action is taken if planned results are not, or will not be, achieved.***

5.2 Policy

5.2.1 Establishing the Quality Policy

Top management shall establish, implement, and maintain a quality policy that:

a. is appropriate to the purpose and context of the organization and supports its strategic direction;

b. provides a framework for setting quality objectives;

c. includes a commitment to satisfy applicable requirements;

d. includes a commitment to continual improvement of the quality management system.

5.2.2 Communicating the Quality Policy

The quality policy shall:

a. be available and maintained as documented information;

b. be communicated, understood, and applied within the organization;

c. be available to relevant interested parties, as appropriate.

5.3 Organizational Roles, Responsibilities, and Authorities

Top management shall ensure that the responsibilities and authorities for relevant roles are assigned, communicated, and understood within the organization.

Top management shall assign the responsibility and authority for:

a. ensuring that the quality management system conforms to the requirements of this Standard;

b. ensuring that the processes are delivering their intended outputs;

c. reporting on the performance of the quality management system and on opportunities for improvement (see 10.1), in particular to top management;

d. ensuring the promotion of customer focus throughout the organization;

e. ensuring that the integrity of the quality management system is maintained when changes to the quality management system are planned and implemented.

f. *Reporting directly to top management/Corporate Quality Head on quality related issues*

Top management shall appoint a specific member of the organization's management, identified as the management representative, who shall have the responsibility and authority for oversight of the above requirements.

The management representative shall have the organizational freedom and unrestricted access to top management to resolve quality management issues.

NOTE: The responsibility of a management representative can include liaison with external parties on matters relating to the quality management system.

6. PLANNING

The Organization shall prepare a Quality Plan (QP) which addresses the contractual requirements prior to the start of activities. The QP shall be a clearly identified discrete document or part of another document that is prepared under the contract.(Para 2.5.5 of Section-I Part-I also refers)

The QP shall play three complimentary roles:

1. *Describe and document the QMS requirements 'contract specific' necessary to satisfy the contract requirements (making reference, where applicable to the 'company vide' QMS).*
2. *Describe and document the planning of the product realization in terms of quality requirements for the product, needed resources, required control activities (verification, validation, monitoring, inspection, testing & reliability demonstration) and Acceptance Criteria.*
3. *Based on above DGAQA will then specify their own check stages in the Quality Plan depending upon the criticality of the stage which will be considered as hold points. The DGAQA will examine the relevant documents for compliance by the manufacturer and also for ensuring that the work pertaining to those stages meets the laid down quality requirements. The DGAQA representative will then carry out the re-verification at the designated stage and ensure that the results of re-verification checks meet the stipulated requirements.*
4. *Quality plan shall be periodically reviewed and updated by the organization in coordination with DGAQA.*

6.1 Actions to Address Risks and Opportunities

6.1.1 When planning for the quality management system, the organization shall consider the issues referred to in 4.1 and the requirements referred to in 4.2 and determine the risks and opportunities that need to be addressed to:

a. give assurance that the quality management system can achieve its intended result(s);

b. enhance desirable effects;

c. prevent, or reduce, undesired effects;

d. achieve improvement.

6.1.2 The organization shall plan:

a. actions to address these risks and opportunities;

b. how to:

I. integrate and implement the actions into its quality management system processes (see 4.4);

II. evaluate the effectiveness of these actions.

Actions taken to address risks and opportunities shall be proportionate to the potential impact on the conformity of products and services.

NOTE 1: Options to address risks can include avoiding risk, taking risk in order to pursue an opportunity, eliminating the risk source, changing the likelihood or consequences, sharing the risk, or retaining risk by informed decision.

NOTE 2: Opportunities can lead to the adoption of new practices, launching new products, opening new markets, addressing new customers, building partnerships, using new technology and other desirable and viable possibilities to address the organization's or its customers' needs.

6.2 Quality Objectives and Planning to Achieve Them

6.2.1 The organization shall establish quality objectives at relevant functions, levels, and processes needed for the quality management system.

The quality objectives shall:

a. be consistent with the quality policy;

b. be measurable;

c. take into account applicable requirements;

d. be relevant to conformity of products and services and to enhancement of customer satisfaction;

e. be monitored;

f. be communicated;

g. be updated, as appropriate.

The organization shall maintain documented information on the quality objectives.

6.2.2 When planning how to achieve its quality objectives, the organization shall determine:

a. what will be done;
b. what resources will be required;
c. who will be responsible;
d. when it will be completed;
e. how the results will be evaluated.

6.3 Planning of Changes

When the organization determines the need for changes to the quality management system, the changes shall be carried out in a planned manner (see 4.4).

The organization shall consider:

a. the purpose of the changes and their potential consequences;
b. the integrity of the quality management system;
c. the availability of resources;
d. the allocation or reallocation of responsibilities and authorities.

7. SUPPORT

7.1 Resources

7.1.1 General

The organization shall determine and provide the resources needed for the establishment, implementation, maintenance, and continual improvement of the quality management system The organization shall consider:

a. the capabilities of, and constraints on, existing internal resources;
b. what needs to be obtained from external providers.

7.1.2 People

The organization shall determine and provide the persons necessary for the effective implementation of its quality management system and for the operation and control of its processes.

7.1.3 Infrastructure

The organization shall determine, provide, and maintain the infrastructure necessary for the operation of its processes and to achieve conformity of products and services.

NOTE: Infrastructure can include:

a. buildings and associated utilities;

b. equipment, including hardware and software;

c. transportation resources;

d. information and communication technology.

7.1.4 Environment for the Operation of Processes

The organization shall determine, provide, and maintain the environment necessary for the operation of its processes and to achieve conformity of products and services.

NOTE: A suitable environment can be a combination of human and physical factors, such as:

a. social (e.g., non-discriminatory, calm, non-confrontational);

b. psychological (e.g., stress-reducing, burnout prevention, emotionally protective); physical (e.g., **temperature, humidity, lighting, cleanliness, protection from electrostatic discharge, strong magnetic field, noise, vibration etc**). These factors can differ substantially depending on the products and services provided.

7.1.5 Monitoring and Measuring Resources

7.1.5.1 General

The organization shall determine and provide the resources needed to ensure valid and reliable results when monitoring or measuring is used to verify the conformity of products and services to requirements.

The organization shall ensure that the resources provided:

a. are suitable for the specific type of monitoring and measurement activities being undertaken;

b. are maintained to ensure their continuing fitness for their purpose.

The organization shall retain appropriate documented information as evidence of fitness for purpose of the monitoring and measurement resources.

7.1.5.2 Measurement Traceability

When measurement traceability is a requirement, or is considered by the organization to be an essential part of providing confidence in the validity of measurement results, measuring equipment shall be:

a. calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; when no such standards exist, the basis used for calibration or verification shall be retained as documented information;

b. identified in order to determine their status;

c. safe guarded from adjustments, damage, or deterioration that would invalidate the calibration status and subsequent measurement results.

The organization shall establish, implement, and maintain a process for the recall of monitoring and measuring equipment requiring calibration or verification.

The organization shall maintain a register of the monitoring and measuring equipment. The register shall include the equipment type, unique identification, location, and the calibration or verification method, frequency, and acceptance criteria.

When an inspection, test and measuring equipment is found to be out of calibration or did not meet the requirements during re-calibration and when there are affected products measured/tested using such measuring equipment, the concerned DGAQA office shall be informed & presented with detail of affected products, including products already delivered, to decide further action.

NOTE: Monitoring and measuring equipment can include, but are not limited to: test hardware, test software, automated test equipment (ATE), and plotters used to produce verification data. It also includes personally owned and customer supplied equipment used to provide evidence of product and service conformity.

Calibration or verification of monitoring and measuring equipment shall be carried out under suitable environmental conditions (see 7.1.4).

The organization shall determine if the validity of previous measurement results has been adversely affected when measuring equipment is found to be unfit for its intended purpose, and shall take appropriate action as necessary.

7.1.6 Organizational Knowledge

The organization shall determine the knowledge necessary for the operation of its processes and to achieve conformity of products and services.

This knowledge shall be maintained and be made available to the extent necessary.

When addressing changing needs and trends, the organization shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates.

NOTE 1: Organizational knowledge is knowledge specific to the organization; it is generally gained by experience. It is information that is used and shared to achieve the organization's objectives.

NOTE 2: Organizational knowledge can be based on:

a. internal sources (e.g., intellectual property; knowledge gained from experience; lessons learned from failures and successful projects; capturing and sharing undocumented knowledge and experience; the results of improvements in processes, products and services);

b. external sources (e.g., standards; academia; conferences; gathering knowledge from customers or external providers).

7.2 Competence

The organization shall:

a. determine the necessary competence of person(s) doing work under its control that affects the performance and effectiveness of the quality management system;

b. ensure that these persons are competent on the basis of appropriate education, training, or experience;

c. where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken;

d. retain appropriate documented information as evidence of competence.

Contents of Para 3&4 of Section-II Part - I and Para 1 of Section-III Part-I are also relevant in this regard.

NOTE: Consideration should be given for the periodic review of the necessary competence.

NOTE: Applicable actions can include, for example, the provision of training to, the mentoring of, or the re-assignment of currently employed persons; or the hiring or contracting of competent persons.

7.3 Awareness

The organization shall ensure that persons doing work under the organization's control are aware of:

a. the quality policy;

b. relevant quality objectives;

c. their contribution to the effectiveness of the quality management system, including the benefits of improved performance;

d. the implications of not conforming with the quality management system requirements;

e. relevant quality management system documented information and changes thereto;

f. their contribution to product or service conformity;

g. their contribution to product safety;

h. the importance of ethical behavior.

7.4 Communication

The organization shall determine the internal and external communications relevant to the quality management system, including:

a. on what it will communicate;

b. when to communicate;

c. with whom to communicate;

d. how to communicate;

e. who communicates.

The organisation shall establish lines of communication with the DGAQA on all aspects affecting quality (Para 6 of Section II part –I also refer)

NOTE: Communication should include internal and external feedback relevant to the quality management system

7.5 Documented Information

7.5.1 General

The organization's quality management system shall include:

a. documented information required by this Standard;

b. documented information determined by the organization as being necessary for the effectiveness of the quality management system.

NOTE: The extent of documented information for a quality management system can differ from one organization to another due to:

- the size of organization and its type of activities, processes, products, and services;
- the complexity of processes and their interactions;
- the competence of persons.

7.5.2 Creating and Updating

When creating and updating documented information, the organization shall ensure appropriate:

a. identification and description (e.g., a title, date, author, or reference number);

b. format (e.g., language, software version, graphics) and media (e.g., paper, electronic);

c. review and approval for suitability and adequacy.

NOTE: ***Approval implies authorized persons and approval methods are identified for the relevant types of documented information, as determined by the organization.***

7.5.3 Control of Documented Information

7.5.3.1 Documented information required by the quality management system and by this Standard shall be controlled to ensure:

a. it is available and suitable for use, where and when it is needed;

b. it is adequately protected (e.g., from loss of confidentiality, improper use, or loss of integrity).

7.5.3.2 For the control of documented information, the organization shall address the following activities, as applicable:

a. distribution, access, retrieval, and use;

b. storage and preservation, including preservation of legibility;

c. control of changes (e.g., version control);

d. retention and disposition;

e. prevention of the unintended use of obsolete documented information by removal or by application of suitable identification or controls if kept for any purpose.

f. <u>The AFQMS Approved firm shall provide Quality recods and documents applicable to the QMS and scope of AFQMS approval in Hard/Soft copy as and when requested by DGAQA.</u>

Documented information of external origin determined by the organization to be necessary for the planning and operation of the quality management system shall be identified as appropriate, and be controlled.

Documented information retained as evidence of conformity shall be protected from unintended alterations.

When documented information is managed electronically, data protection processes shall be defined (e.g., protection from loss, unauthorized changes, unintended alteration, corruption, physical damage).

Note: Access can imply a decision regarding the permission to visit the documented information only, or the permission and authority to view and change the documented information

8. OPERATION

8.1 Operational Planning and Control

The organization shall plan, implement, and control the processes (see 4.4) needed to meet the requirements for the provision of products and services, and to implement the actions determined in clause 6, by:

a. determining the requirements for the products and services;

NOTE: ***Determination of requirements for the products and services should include consideration of:***

- ***personal and product safety;***
- ***producibility and inspectability;***
- ***reliability, availability, and maintainability;***
- ***suitability of parts and materials used in the product;***
- ***selection and development of embedded software;***
- ***product obsolescence;***
- ***prevention, detection, and removal of foreign objects;***
- ***handling, packaging, and preservation;***
- ***recycling or final disposal of the product at the end of its life.***

b. establishing criteria for:

- the processes;
- the acceptance of products and services;

NOTE: ***According to the nature of the product and depending on the specified requirements, statistical techniques can be used to support:***

- ***design verification (e.g., reliability, maintainability, product safety);***
- ***process control;***
  - ***selection and verification of key characteristics;***
  - ***process capability measurements; statistical process control;***
  - ***design of experiments;***
- ***verification;***
- ***failure mode, effects, and criticality analysis.***

c. determining the resources needed to achieve conformity to the product and service requirements ***and to meet on-time delivery of products and services;***

d. implementing control of the processes in accordance with the criteria;

e. determining, maintaining, and retaining documented information to the extent necessary:

1. to have confidence that the processes have been carried out as planned;
2. to demonstrate the conformity of products and services to their requirements;

f. determining the processes and controls needed to manage critical items, including production process controls when key characteristics have been identified;

g. engaging representatives of affected organization functions for operational planning and control;

h. determining the process and resources to support the use and maintenance of the products and services;

i. determining the products and services to be obtained from external providers;

j. establishing the controls needed to prevent the delivery of nonconforming products and services to the customer.

NOTE: One method to achieve operational planning and control can be through using integrated phased processes.

As appropriate to the organization, customer requirements, and products and services, the organization shall plan and manage product and service provision in a structured and controlled manner including scheduled events performed in a planned sequence to meet requirements at acceptable risk, within resource and schedule constraints.

NOTE: This activity is generally referred to as project planning, project management, or program management.

The output of this planning shall be suitable for the organization's operations.

NOTE: As an output of this planning, documented information specifying the processes of the quality management system and the resources to be applied to a specific product, service, project, or contract can be referred to as a quality plan.

The organization shall control planned changes and review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.

The organization shall ensure that outsourced processes are controlled (see 8.4). ***The organization shall establish, implement, and maintain a process to plan and control the temporary or permanent transfer of work, to ensure the continuing conformity of the work to requirements. The process shall ensure that work transfer impacts and risks are managed.***

NOTE: For the control of work transfer from the organization to an external provider, or from an external provider to another external provider, see 8.4. For the control of work transfer from one organization facility to another, or from an external provider to the organization, see 8.5. (Para 2.5.2 & 4 of Section-I Part-I also refer)

8.1.1 Operational Risk Management

The organization shall plan, implement, and control a process for managing operational risks to the achievement of applicable requirements, which includes as appropriate to the organization and the products and services:

- *a. assignment of responsibilities for operational risk management;*
- *b. definition of risk assessment criteria (e.g., likelihood, consequences, risk acceptance);*
- *c. identification, assessment, and communication of risks throughout operations;*
- *d. identification, implementation, and management of actions to mitigate risks that exceed the defined risk acceptance criteria;*
- *e. acceptance of risks remaining after implementation of mitigating actions.*

NOTE 1: While clause 6.1 addresses the risks and opportunities when planning for the quality management system of the organization, the scope of this clause (8.1.1) is limited to the risks associated to the operational processes needed for the provision of products and services (clause 8).

NOTE 2: Within the aviation, space, and defense industry, risk is generally expressed in terms of the likelihood of occurrence and the severity of the consequences.

8.1.2 Configuration Management

The organization shall plan, implement, and control a process for configuration management as appropriate to the organization and its products and services in order to ensure the identification and control of physical and functional attributes throughout the product lifecycle. This process shall:

- *a. control product identity and traceability to requirements, including the implementation of identified changes;*
- *b. ensure that the documented information (e.g., requirements, design, verification, validation and acceptance documentation) is consistent with the actual attributes of the products and services.*

8.1.3 Product Safety

The organization shall plan, implement, and control the processes needed to assure product safety during the entire product life cycle, as appropriate to the organization and the product.

NOTE: Examples of these processes include:

- ***assessment of hazards and management of associated risks (see 8.1.1);***
- ***management of safety critical items;***
- ***analysis and reporting of occurred events affecting safety;***
- ***communication of these events and training of persons.***

8.1.4 Prevention of Counterfeit Parts

The organization shall plan, implement, and control processes, appropriate to the organization and the product, for the prevention of counterfeit or suspect counterfeit part use and their inclusion in product(s) delivered to the customer.

NOTE: Counterfeit part prevention processes should consider:

- ***training of appropriate persons in the awareness and prevention of counterfeit parts;***
- ***application of a parts obsolescence monitoring program;***
- ***controls for acquiring externally provided product from original or authorized manufacturers, authorized distributors, or other approved sources;***
- ***requirements for assuring traceability of parts and components to their original or authorized manufacturers;***
- ***verification and test methodologies to detect counterfeit parts;***
- ***monitoring of counterfeit parts reporting from external sources;***
- ***quarantine and reporting of suspect or detected counterfeit parts.***

8.2 Requirements for Products and Services

8.2.1 Customer Communication

Communication with customers shall include:

a. providing information relating to products and services;

b. handling enquiries, contracts, or orders, including changes;

c. obtaining customer feedback relating to products and services, including customer complaints;

d. handling or controlling customer property;

e. establishing specific requirements for contingency actions, when relevant.

8.2.2 Determining the Requirements for Products and Services

When determining the requirements for the products and services to be offered to customers, the organization shall ensure that:

a. the requirements for the products and services are defined, including:
   1. any applicable statutory and regulatory requirements;
   2. those considered necessary by the organization;
b. the organization can meet the claims for the products and services it offers;
c. special requirements of the products and services are determined;
d. operational risks (e.g., new technology, ability and capacity to provide, short delivery time frame) have been identified.

8.2.3 Review of the Requirements for Products and Services

8.2.3.1 The organization shall ensure that it has the ability to meet the requirements for products and services to be offered to customers. The organization shall conduct a review before committing to supply products and services to the customer, to include:

a. requirements specified by the customer, including the requirements for delivery and post-delivery activities;
b. requirements not stated by the customer, but necessary for the specified or intended use, when known;
c. requirements specified by the organization;
d. statutory and regulatory requirements applicable to the products and services;
e. contract or order requirements differing from those previously expressed.

This review shall be coordinated with applicable functions of the organization.

If upon review the organization determines that some customer requirements cannot be met or can only partially be met, the organization shall negotiate a mutually acceptable requirement with the customer.

The organization shall ensure that contract or order requirements differing from those previously defined are resolved.

The customer requirements shall be confirmed by the organization before acceptance, when the customer does not provide a documented statement of their requirements.

NOTE: In some situations, such as internet sales, a formal review is impractical for each order. Instead, the review can cover relevant product information, such as catalogues.

8.2.3.2 The organization shall retain documented information, as applicable:

a. on the results of the review;

b. on any new requirements for the products and services.

8.2.4 Changes to Requirements for Products and Services

The organization shall ensure that relevant documented information is amended, and that relevant persons are made aware of the changed ***requirements within a given reasonable time frame as per factory document procedure, when the requirements for products and services are changed.***

8.3 Design and Development of Products and Services

8.3.1 General

The organization shall establish, implement, and maintain a design and development process that is appropriate to ensure the subsequent provision of products and services.

8.3.2 Design and Development Planning

In determining the stages and controls for design and development, the organization shall consider:

a. the nature, duration, and complexity of the design and development activities;

b. the required process stages, including applicable design and development reviews;

c. the required design and development verification and validation activities;

d. the responsibilities and authorities involved in the design and development process;

e. the internal and external resource needs for the design and development of products and services;

f. the need to control interfaces between persons involved in the design and development process;

g. the need for involvement of customers and users in the design and development process;

h. the requirements for subsequent provision of products and services;

i. the level of control expected for the design and development process by customers and other relevant interested parties;

j. the documented information needed to demonstrate that design and development requirements have been met.

When appropriate, the organization shall divide the design and development effort into distinct activities and, for each activity, define the tasks, necessary resources, responsibilities, design content, and inputs and outputs.

Design and development planning shall consider the ability to provide, verify, test and maintain products and services (reference output of 8.1 a).

8.3.3 Design and Development Inputs

The organization shall determine the requirements essential for the specific types of products and services to be designed and developed. The organization shall consider:

a. functional and performance requirements;
b. information derived from previous similar design and development activities;
c. statutory and regulatory requirements;
d. standards or codes of practice that the organization has committed to implement;
e. potential consequences of failure due to the nature of the products and services;
f. when applicable, the potential consequences of obsolescence (e.g., materials, processes, components, equipment, products).

Inputs shall be adequate for design and development purposes, complete, and unambiguous.

Conflicting design and development inputs shall be resolved.

The organization shall retain documented information on design and development inputs.

NOTE: The organization can also consider as design and development inputs other information such as benchmarking, external provider feedback, internally generated data, and in-service data.

8.3.4 Design and Development Controls

The organization shall apply controls to the design and development process to ensure that:

a. the results to be achieved are defined;
b. reviews are conducted to evaluate the ability of the results of design and development to meet requirements; verification activities are conducted to ensure that the design and development outputs meet the input requirements;
c. validation activities are conducted to ensure that the resulting products and services meet the requirements for the specified application or intended use;
d. any necessary actions are taken on problems determined during the reviews, or verification and validation activities;
e. documented information of these activities is retained;
f. progression to the next stage is authorized.

Participants in design and development reviews shall include representatives of functions concerned with the design and development stage(s) being reviewed.

NOTE: Design and development reviews, verification, and validation have distinct purposes. They can be conducted separately or in any combination, as is suitable for the products and services of the organization.

8.3.4.1 When tests are necessary for verification and validation, these tests shall be planned, controlled, reviewed, and documented to ensure and prove the following:

- ***a. test plans or specifications identify the test item being tested and the resources being used, define test objectives and conditions, parameters to be recorded and relevant acceptance criteria;***
- ***b. test procedures describe the test methods to be used, how to perform the test, and how to record the results;***
- ***c. the correct configuration of the test item is submitted for the test;***
- ***d. the requirements of the test plan and the test procedures are observed;***
- ***e. the acceptance criteria are met.***

Monitoring and measuring devices used for testing shall be controlled as defined in clause 7.1.5.

At the completion of design and development, the organization shall ensure that reports, calculations, test results, etc., are able to demonstrate that the design for the product or service meets the specification requirements for all identified operational conditions.

8.3.5 Design and Development Outputs

The organization shall ensure that design and development outputs:

- a. meet the input requirements;
- b. are adequate for the subsequent processes for the provision of products and services;
- c. include or reference monitoring and measuring requirements, as appropriate, and acceptance criteria;
- d. specify the characteristics of products and services that are essential for their intended purpose and their safe and proper provision;
- ***e. specify, as applicable, any critical items, including any key characteristics, and specific actions to be taken for these items;***

are approved by authorized person(s) prior to release The organization shall define the data required to allow the product to be identified, manufactured, verified, used, and maintained.

NOTE: Data can include:

- ***the drawings, part lists, and specifications necessary to define the configuration and the design features of the product;***
- ***the material, process, manufacturing, assembly, handling, packaging, and preservation data needed to provide and maintain a conforming product or service;***
- ***the technical data and repair schemes for operating and maintaining the product.***

The organization shall retain documented information on design and development outputs.

8.3.6 Design and Development Changes

The organization shall identify, review, and control changes made during, or subsequent to, the design and development of products and services, to the extent necessary to ensure that there is no adverse impact on conformity to requirements.

The organization shall implement a process with criteria for notifying its customer, prior to implementation, about changes that affect customer requirements.

The organization shall retain documented information on:

a. design and development changes;
b. the results of reviews;
c. the authorization of the changes;
d. the actions taken to prevent adverse impacts.

Design and development changes shall be controlled in accordance with the configuration management process requirements.

8.4 Control of Externally Provided Processes, Products, and Services

8.4.1 General

The organization shall ensure that externally provided processes, products, and services conform to requirements. ***(Para 2.5.2 & 4 of Section-I Part-I also refer)***

The organization shall be responsible for the conformity of all externally provided processes, products, and services, including from sources defined by the customer.

The organization shall ensure, when required, that customer-designated or approved external providers, including process sources (e.g., special processes), are used.

The organization shall identify and manage the risks associated with the external provision of processes, products, and services, as well as the selection and use of external providers.

The organization shall require that external providers apply appropriate controls to their direct and sub-tier external providers, to ensure that requirements are met. The organization shall determine the controls to be applied to externally provided processes, products, and services when:

a. products and services from external providers are intended for incorporation into the organization's own products and services;

b. products and services are provided directly to the customer(s) by external providers on behalf of the organization;

c. a process, or part of a process, is provided by an external provider as a result of a decision by the organization.

The organization shall determine and apply criteria for the evaluation, selection, monitoring of performance, and re-evaluation of external providers, based on their ability to provide processes or products and services in accordance with requirements. The organization shall retain documented information of these activities and any necessary actions arising from the evaluations.

NOTE: ***During external provider evaluation and selection, the organization can use quality data from objective and reliable external sources, as evaluated by the organization (e.g., information from accredited quality management system or process certification bodies, external provider approvals from government authorities or customers). Use of such data would be only one element of an organization's external provider control process and the organization remains responsible for verifying that externally provided processes, products, and services meet specified requirements.***

8.4.1.1 The organization shall:

a. define the process, responsibilities, and authority for the approval status decision, changes of the approval status, and conditions for a controlled use of external providers depending on their approval status;

b. maintain a register of its external providers that includes approval status (e.g., approved, conditional, disapproved) and the scope of the approval (e.g., product type, process family);

c. periodically review external provider performance including process, product and service conformity (including but not limited to rework, repair, concession and rejections) , and on-time delivery performance;

d. define the necessary actions to take when dealing with external providers that do not meet requirements;

e. define the requirements for controlling documented information created by and/or retained by external providers.

f. <u>The main contractor shall provide a list of items that are outsourced in the beginning of the program/ project to DGAQA for their information and supervision (as necessary) and update the list on an annual basis.</u>

8.4.2 Type and Extent of Control The organization shall ensure that externally provided processes, products, and services do not adversely affect the organization's ability to consistently deliver conforming products and services to its customers.

The organization shall:

a. ensure that externally provided processes remain within the control of its quality management system;

b. define both the controls that it intends to apply to an external provider and those it intends to apply to the resulting output;

c. take into consideration:

1. the potential impact of the externally provided processes, products, and services on the organization's ability to consistently meet customer and applicable statutory and regulatory requirements;
2. the effectiveness of the controls applied by the external provider;
3. ***the results of the periodic review of external provider performance (see 8.4.1.1 c);***

d. determine the verification, or other activities, necessary to ensure that the externally provided processes, products, and services meet requirements.

Verification activities of externally provided processes, products, and services shall be performed according to the risks identified by the organization. These shall include inspection or periodic testing, as applicable, when there is high risk of nonconformities including counterfeit parts.

NOTE 1: Customer verification activities performed at any level of the supply chain does not absolve the organization of its responsibility to provide acceptable processes, products, and services and to comply with all requirements.

NOTE 2: Verification activities can include:

- ***review of objective evidence of the conformity of the processes, products, and services from the external provider (e.g., accompanying documentation, certificate of conformity, test documentation, statistical documentation, process control documentation, results of production process verification and assessment of changes to the production process thereafter);***
- ***inspection and audit at the external provider's premises;***

- ***review of the required documentation;***
- ***review of production part approval process data;***
- ***inspection of products or verification of services upon receipt;***
- ***review of delegations of product verification to the external provider.***

When externally provided product is released for production use pending completion of all required verification activities, it shall be identified and recorded to allow recall and replacement if it is subsequently found that the product does not meet requirements.

When the organization delegates verification activities to the external provider, the scope and requirements for delegation shall be defined and a register of delegations shall be maintained. The organization shall periodically monitor the external provider's delegated verification activities.

When external provider test reports are utilized to verify externally provided products, the organization shall implement a process to evaluate the data in the test reports to confirm that the product meets requirements. When a customer or organization has identified raw material as a significant operational risk (e.g., critical items), the organization shall implement a process to validate the accuracy of test reports.

8.4.3 Information for External Providers

The organization shall ensure the adequacy of requirements prior to their communication to the external provider.

The organization shall communicate to external providers its requirements for:

a. the processes, products, and services to be provided ***including the identification of relevant technical data (e.g., specifications, drawings, process requirements, work instructions);***

b. the approval of:
   1. products and services;
   2. methods, processes, and equipment;

   the release of products and services;

c. competence, including any required qualification of persons;

d. the external providers' interactions with the organization;

e. control and monitoring of the external providers' performance to be applied by the organization;

f. verification or validation activities that the organization, or its customer, intends to perform at the external providers' premises;

g. design and development control;

h. special requirements, critical items, or key characteristics;

i. test, inspection, and verification (including production process verification);

j. the use of statistical techniques for product acceptance and related instructions for acceptance by the organization;

k. the need to:

- ***implement a quality management system;***
- ***use customer-designated or approved external providers, including process sources (e.g., special processes);***
- ***notify the organization of nonconforming processes, products, or services and obtain approval for their disposition;***
- ***prevent the use of counterfeit parts (see 8.1.4);***
- ***notify the organization of changes to processes, products, or services, including changes of their external providers or location of manufacture, and obtain the organization's approval;***
- ***flow down to external providers applicable requirements including customer requirements;***
- ***provide test specimens for design approval, inspection/verification, investigation, or auditing;***
- ***retain documented information, including retention periods and disposition requirements;***

l. the right of access by the organization, their customer, and regulatory authorities to the applicable areas of facilities and to applicable documented information, at any level of the supply chain;

m. ensuring that persons are aware of:

- ***their contribution to product or service conformity;***
- ***their contribution to product safety; the importance of ethical behavior.***

8.5 Production and Service Provision

8.5.1 Control of Production and Service Provision

The organization shall implement production and service provision under controlled conditions

Controlled conditions shall include, as applicable:

a. the availability of documented information that defines:

1. the characteristics of the products to be produced, the services to be provided, or the activities to be performed;

2. the results to be achieved;

NOTE 1: Documented information that defines characteristics of products and services can include digital product definition data, drawings, parts lists, materials, and process specifications.

NOTE 2: Documented information for activities to be performed and results to be achieved can include process flow charts, control plans, production documents (e.g., manufacturing plans, travelers, routers, work orders, process cards), and verification documents.

b. the availability and use of suitable monitoring and measuring resources;

c. the implementation of monitoring and measurement activities at appropriate stages to verify that criteria for control of processes or outputs, and acceptance criteria for products and services, have been met;

1. ensuring that documented information for monitoring and measurement activity for product acceptance includes:

- ***criteria for acceptance and rejection;***
- ***where in the sequence verification operations are to be performed;***
- ***measurement results to be retained (at a minimum an indication of acceptance or rejection);***
- ***any specific monitoring and measurement equipment required and instructions associated with their use;***

2. ensuring that when sampling is used as a means of product acceptance, the sampling plan is justified on the basis of recognized statistical principles and appropriate for use (i.e., matching the sampling plan to the criticality of the product and to the process capability).

d. the use of suitable infrastructure and environment for the operation of processes;

NOTE: Suitable infrastructure can include product specific tools (e.g., jigs, fixtures, molds) and software programs.

e. the appointment of competent persons, including any required qualification;

f. the validation, and periodic revalidation, of the ability to achieve planned results of the processes for production and service provision, where the resulting output cannot be verified by subsequent monitoring or measurement;

NOTE: These processes can be referred to as special processes (see 8.5.1.2).

g. the implementation of actions to prevent human error;

h. the implementation of release, delivery, and post-delivery activities;

i. the establishment of criteria for workmanship (e.g., written standards, representative samples, illustrations);

j. the accountability for all products during production (e.g., parts quantities, split orders, nonconforming product);

k. the control and monitoring of identified critical items, including key characteristics, in accordance with established processes;

l. the determination of methods to measure variable data (e.g., tooling, on-machine probing, inspection equipment);

m. the identification of in-process inspection/verification points when adequate verification of conformity cannot be performed at later stages;

n. the availability of evidence that all production and inspection/verification operations have been completed as planned, or as otherwise documented and authorized;

o. the provision for the prevention, detection, and removal of foreign objects;

p. the control and monitoring of utilities and supplies (e.g., water, compressed air, electricity, chemical products) to the extent they affect conformity to product requirements (see 7.1.3);

q. the identification and recording of products released for subsequent production use pending completion of all required measuring and monitoring activities, to allow recall and replacement if it is later found that the product does not meet requirements.

8.5.1.1 Control of Equipment, Tools, and Software Programs

Equipment, tools, and software programs used to automate, control, monitor, or measure production processes shall be validated prior to final release for production and shall be maintained.

Storage requirements shall be defined for production equipment or tooling in storage including any necessary periodic preservation or condition checks.

8.5.1.2 Validation and Control of Special Processes

For processes where the resulting output cannot be verified by subsequent monitoring or measurement, the organization shall establish arrangements for these processes including, as applicable:

a. definition of criteria for the review and approval of the processes;

b. determination of conditions to maintain the approval;

approval of facilities and equipment;

a. qualification of persons;

b. use of specific methods and procedures for implementation and monitoring the processes;

c. requirements for documented information to be retained.

8.5.1.3 Production Process Verification

The organization shall implement production process verification activities to ensure the production process is able to produce products that meet requirements.

NOTE: These activities can include risk assessments, capacity studies, capability studies, and control plans

The organization shall use a representative item from the first production run of a new part or assembly to verify that the production processes, production documentation, and tooling are able to produce parts and assemblies that meet requirements. This activity shall be repeated when changes occur that invalidate the original results (e.g., engineering changes, production process changes, tooling changes).

NOTE: This activity can be referred to as First Article Inspection (FAI), the firm shall comply this as per AS9102 in coordination with DGAQA.

The organization shall retain documented information on the results of production process verification which shall cover all *design characteristic mentioned in the drawing & specification. Records of same to be maintained and attached with clearance request to DGAQA for first article clearance.*

8.5.2 Identification and Traceability

The organization shall use suitable means to identify outputs when it is necessary to ensure the conformity of products and services.

The organization shall maintain the identification of the configuration of the products and services in order to identify any differences between the actual configuration and the required configuration.

The organization shall identify the status of outputs with respect to monitoring and measurement requirements throughout production and service provision.

When acceptance authority media are used (e.g., stamps, electronic signatures, passwords), the organization shall establish controls for the media.

The organization shall control the unique identification of the outputs when traceability is a requirement, and shall retain the documented information necessary to enable traceability.

NOTE: Traceability requirements can include:

- ***the identification to be maintained throughout the product life;***
- ***the ability to trace all products manufactured from the same batch of raw material, or from the same manufacturing batch, to the destination (e.g.,***

delivery, scrap);

- ***for an assembly, the ability to trace its components to the assembly and then to the next higher assembly;***
- ***for a product, a sequential record of its production (manufacture, assembly, inspection/verification) to be retrievable.***

8.5.3 Property Belonging to Customers or External Providers

The organization shall exercise care with property belonging to customers or external providers while it is under the organization's control or being used by the organization.

The organization shall identify, verify, protect, and safeguard customers' or external providers' property provided for use or incorporation into the products and services.

When the property of a customer or external provider is lost, damaged, or otherwise found to be unsuitable for use, the organization shall report this to the customer/DGAQA or external provider and retain documented information on what has occurred.

NOTE: A customer's or external provider's property can include materials, components, tools and equipment, premises, intellectual property, and personal data.

8.5.4 Preservation

The organization shall preserve the outputs during production and service provision, to the extent necessary to ensure conformity to requirements.

NOTE: Preservation can include identification, handling, contamination control, packaging, storage, transmission or transportation, and protection.

Preservation of outputs shall also include, when applicable in accordance with specifications and applicable statutory and regulatory requirements, provisions for:

a. cleaning;
b. prevention, detection, and removal of foreign objects;
c. special handling and storage for sensitive products;
d. marking and labeling, including safety warnings and cautions;
e. shelf life control and stock rotation;
f. special handling and storage for hazardous materials.

8.5.5 Post-Delivery Activities

The organization shall meet requirements for post-delivery activities associated with the products and services.

In determining the extent of post-delivery activities that are required, the organization shall consider:

a. statutory and regulatory requirements;
b. the potential undesired consequences associated with its products and services;
c. the nature, use, and intended lifetime of its products and services;
d. customer requirements;
e. customer feedback;
f. collection and analysis of in-service data (e.g., performance, reliability, lessons learned);
g. control, updating, and provision of technical documentation relating to product use, maintenance, repair, and overhaul;
h. controls required for work undertaken external to the organization (e.g., off-site work);
i. product/customer support (e.g., queries, training, warranties, maintenance, replacement parts, resources, obsolescence).

When problems are detected after delivery, the organization shall take appropriate action including investigation and reporting.

NOTE: *In case of serious observations related to flight safety, the same shall be brought to the notice of DGAQA at the earliest possible opportunity. All warranty activities related to quality of product by the Approved Firm and those undertaken at customer's facilities by the Approved Firm's team shall be informed to DGAQA on quarterly basis.*

NOTE: Post-delivery activities can include actions under warranty provisions, contractual obligations such as maintenance services, and supplementary services such as recycling or final disposal.

8.5.6 Control of Changes The organization shall review and control changes for production or service provision, to the extent necessary to ensure continuing conformity with requirements.

Persons authorized to approve production or service provision changes shall be identified.

NOTE: Production or service provision changes can include the changes affecting processes, production equipment, tools, or software programs.

The organization shall retain documented information describing the results of the review of changes, the person(s) authorizing the change, and any necessary actions arising from the review.

8.6 Release of Products and Services

The organization shall implement planned arrangements, at appropriate stages, to verify that the product and service requirements have been met.

The release of products and services to the customer shall not proceed until the planned

arrangements have been satisfactorily completed, unless otherwise approved by a relevant authority and, as applicable, by the customer.

The organization shall retain documented information on the release of products and services. The documented information shall include:

a. evidence of conformity with the acceptance criteria *(i.e Inspection Record Sheet indicating the measured values of design characteristics mentioned in the drawing & specification)* ;

b. traceability to the person(s) authorizing the release.

When required to demonstrate product qualification, the organization shall ensure that retained documented information provides evidence that the products and services meet the defined requirements.

The organization shall ensure that all documented information required to accompany the products and services are present at delivery.

8.7 Control of Nonconforming Outputs

8.7.1 The organization shall ensure that outputs that do not conform to their requirements are identified and controlled to prevent their unintended use or delivery.

NOTE: The term "nonconforming outputs" includes nonconforming product or service generated internally, received from an external provider, or detected on subsequent build-up stage or identified by a customer.

The organization shall take appropriate action based on the nature of the nonconformity and its effect on the conformity of products and services. This shall also apply to nonconforming products and services detected after delivery of products, during or after the provision of services.

Applicable clauses on control of Non Conformances in DDPMAS shall be followed accordingly. This is applicable for outsourced products also.

Procedures for disposition of Non-conforming product shall be detailed in the QMS of the organisation.

The methodology for disposition of non-conforming products shall consist of a root cause analysis conducted by the organization and corrective & preventive measures identified and implemented.

The Approved Firm shall notify DGAQA on non-conforming product received from their sub-contractors that had been subject to DGAQA Clearance.

The organization's nonconformity control process shall be maintained as documented information including the provisions for:

- ***defining the responsibility and authority for the review and disposition of nonconforming outputs and the process for approving persons making these decisions;***

- ***taking actions necessary to contain the effect of the nonconformity on other processes, products, or services;***
- ***timely reporting of nonconformities affecting delivered products and services to the customer and to relevant interested parties;***
- ***defining corrective actions for nonconforming products and services detected after delivery, as appropriate to their impacts (see 10.2).***

NOTE: Interested parties requiring notification of nonconforming products and services can include external providers, internal organizations, customers, distributors, and regulatory authorities. The organization shall deal with nonconforming outputs in one or more of the following ways:

a. correction;

b. segregation, containment, return, or suspension of provision of products and services;

c. informing the customer;

d. obtaining authorization for acceptance under concession ***by a relevant authority and, when applicable, by the customer.***

Dispositions of use-as-is or repair for the acceptance of nonconforming products shall only be implemented:

- ***after approval by an authorized representative of the organization responsible for design or by persons having delegated authority from the design organization;***
- ***after authorization by the customer, if the nonconformity results in a departure from the contract requirements.***

Product dispositioned for scrap shall be conspicuously and permanently marked, or positively controlled, until physically rendered unusable.

Counterfeit, or suspect counterfeit, parts shall be controlled to prevent reentry into the supply chain.

Conformity to the requirements shall be verified when nonconforming outputs are corrected.

8.7.2 The organization shall retain documented information that:

a. describes the nonconformity;

b. describes the actions taken;

c. describes any concessions obtained;

d. identifies the authority deciding the action in respect of the nonconformity.

9. PERFORMANCE EVALUATION

9.1 Monitoring, Measurement, Analysis, and Evaluation

9.1.1 General

The organization shall determine:

a. what needs to be monitored and measured;

b. the methods for monitoring, measurement, analysis, and evaluation needed to ensure valid results;

c. when the monitoring and measuring shall be performed;

d. when the results from monitoring and measurement shall be analyzed and evaluated.

The Organization shall determine and monitor the Key Quality Performance Indicator (QPI) appropriate to the organization {including but not limited to First Time Quality, Rework, Repair, Concessions, Quality Escapes (internal & external), Audit Non-conformances On Time Delivery to the Specified Requirements, (internal & external),} , DIR data under quarterly submission of data to DGAQA

The organization shall evaluate the performance and the effectiveness of the quality management system. The organization shall retain appropriate documented information as evidence of the results. ***QPI data shall be shared with DGAQA periodically to provide insight into organisation QMS effectiveness.***

9.1.2 Customer Satisfaction

The organization shall monitor customers' perceptions of the degree to which their needs and expectations have been fulfilled. The organization shall determine the methods for obtaining, monitoring, and reviewing this information.

Information to be monitored and used for the evaluation of customer satisfaction shall include, but is not limited to, product and service conformity, on- time delivery performance, customer complaints, and corrective action requests. The organization shall develop and implement plans for customer satisfaction improvement that address deficiencies identified by these evaluations, and assess the effectiveness of the results. *For efficient monitoring of these efforts, use of Customer Satisfaction Index (CSI) may be considered by the main contractor which should include the QPIs.*

NOTE: Examples of monitoring customer perceptions can include customer surveys, customer feedback on delivered products and services, meetings with customers, market-share analysis, compliments, warranty claims, and dealer reports.

NOTE: *Any complaints or deficiencies relevant to the contract reported by DGAQA, will be recorded as customer complaints and shall be part of Management Review Input.*

9.1.3 Analysis and Evaluation

The organization shall analyze and evaluate appropriate data and information arising from monitoring and measurement.

NOTE: Appropriate data can include information on product and service problems reported by external sources (e.g., government/industry alerts, advisories).

The results of analysis shall be used to evaluate:

a. conformity of products and services;
b. the degree of customer satisfaction;
c. the performance and effectiveness of the quality management system;
d. if planning has been implemented effectively;
e. the effectiveness of actions taken to address risks and opportunities;
f. the performance of external providers;
g. the need for improvements to the quality management system.

NOTE: Methods to analyze data can include statistical techniques.

9.2 Internal Audit

9.2.1 The organization shall conduct internal audits at planned intervals to provide information on whether the quality management system;

a. conforms to:

1. the organization's own requirements for its quality management system;

NOTE: The organization's own requirements should include customer and applicable statutory and regulatory quality management system requirements.

b. the requirements of this Standard; is effectively implemented and maintained.

c. *The main contractor shall make available internal audit reports to DGAQA when requested.*

NOTE: When conducting internal audits, performance indicators can be evaluated to determine whether the quality management system is effectively implemented and maintained.

9.2.2 The organization shall:

a. plan, establish, implement, and maintain an audit program(s) including the frequency, methods, responsibilities, planning requirements, and reporting, which shall take into consideration the importance of the processes concerned, changes affecting the organization, and the results of previous audits;

b. ***The Organisation shall have independent Audit department/section delinked from all production & Inspection activities under direct control of Quality Head.***

c. define the audit criteria and scope for each audit; ***shall cover System, Product, Process as well as all business process.***

d. select auditors and conduct audits to ensure objectivity and the impartiality of the audit process;

e. ensure that the results of the audits are reported to relevant management;

f. take appropriate correction and corrective actions without undue delay;

g. retain documented information as evidence of the implementation of the audit program and the audit results.

NOTE: See ISO 19011 for guidance.

9.3 Management Review

9.3.1 General

Top management shall review the organization's quality management system, at planned intervals, to ensure its continuing suitability, adequacy, effectiveness, and alignment with the strategic direction of the organization.

9.3.2 Management Review Inputs

The management review shall be planned and carried out taking into consideration:

a. the status of actions from previous management reviews;

b. changes in external and internal issues that are relevant to the quality management system;

c. information on the performance and effectiveness of the quality management system, including trends in:

1. customer satisfaction and feedback from relevant interested parties;
2. the extent to which quality objectives have been met;
3. process performance and conformity of products and services;
4. nonconformities and corrective actions;
5. monitoring and measurement results;
6. audit results;
7. the performance of external providers;
8. ***on-time delivery performance;***

d. the adequacy of resources;

e. the effectiveness of actions taken to address risks and opportunities (see 6.1);

f. opportunities for improvement.

g. *Non-conformity / observation reported by DGAQA*

9.3.3 Management Review Outputs

The outputs of the management review shall include decisions and actions related to:

a. opportunities for improvement;

b. any need for changes to the quality management system;

c. resource needs;

d. ***risks identified.***

The organization shall retain documented information as evidence of the results of management reviews.

NOTE: *Records from management reviews should include Reviews of Input & Output and shall be maintained. The same shall be made available to the DGAQA when requested.*

10. IMPROVEMENT

10.1 General

The organization shall determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and enhance customer satisfaction.

These shall include:

a. improving products and services to meet requirements as well as to address future needs and expectations;

b. correcting, preventing, or reducing undesired effects;

c. improving the performance and effectiveness of the quality management system.

NOTE: Examples of improvement can include correction, corrective action, continual improvement, breakthrough change, innovation, and reorganization.

10.2 Nonconformity and Corrective Action

10.2.1 When a nonconformity occurs, including any arising from complaints, the organization shall:

a. react to the nonconformity and, as applicable:

1. take action to control and correct it;

2. deal with the consequences;

b. evaluate the need for action to eliminate the cause(s) of the nonconformity, in

order that it does not recur or occur elsewhere, by:

1. reviewing and analyzing the nonconformity;
2. determining the causes of the nonconformity, ***including, as applicable, those related to human factors;***
3. determining if similar nonconformities exist, or could potentially occur;

c. implement any action needed;

d. review the effectiveness of any corrective action taken;

e. update risks and opportunities determined during planning, if necessary;

f. make changes to the quality management system, if necessary;

g. flow down corrective action requirements to an external provider when it is determined that the external provider is responsible for the nonconformity;

h. take specific actions when timely and effective corrective actions are not achieved.

Corrective actions shall be appropriate to the effects of the nonconformities encountered.

The organization shall maintain documented information that defines the non conformity and corrective action management processes.

10.2.2 The organization shall retain documented information as evidence of:

a. the nature of the nonconformities and any subsequent actions taken;

b. the results of any corrective action.

10.3 Continual Improvement

The organization shall continually improve the suitability, adequacy, and effectiveness of the quality management system.

The organization shall consider the results of analysis and evaluation, and the outputs from management review, to determine if there are needs or opportunities that shall be addressed as part of continual improvement.

The organization shall monitor the implementation of improvement activities and evaluate the effectiveness of the results.

NOTE: Examples of continual improvement opportunities can include lessons learned, problem resolutions, and the benchmarking of best practices.

ANNEX A – CLARIFICATION OF NEW STRUCTURE, TERMINOLOGY AND CONCEPTS (INFORMATIVE)

A.1 STRUCTURE AND TERMINOLOGY

The clause structure (i.e., clause sequence) and some of the terminology of this edition of this Standard, in comparison with the previous edition (ISO 9001:2008), have been changed to improve alignment with other management systems standards.

There is no requirement in this Standard for its structure and terminology to be applied to the documented information of an organization's quality management system.

The structure of clauses is intended to provide a coherent presentation of requirements, rather than a model for documenting an organization's policies, objectives, and processes. The structure and content of documented information related to a quality management system can often be more relevant to its users if it relates to both the processes operated by the organization and information maintained for other purposes.

There is no requirement for the terms used by an organization to be replaced by the terms used in this Standard to specify quality management system requirements. Organizations can choose to use terms which suit their operations (e.g., using "records", "documentation", or "protocols" rather than "documented information"; or "supplier", "partner", or "vendor" rather than "external provider"). Table A1 shows the major differences in terminology between this edition of this Standard and the previous edition.

A.2 PRODUCTS AND SERVICES

ISO 9001:2008 used the term "product" to include all output categories. This edition of this Standard uses "products and services". "Products and services" include all output categories (hardware, services, software, and processed materials).

The specific inclusion of "services" is intended to highlight the differences between products and services in the application of some requirements. The characteristic of services is that at least part of the output is realized at the interface with the customer. This means, for example, that conformity to requirements cannot necessarily be confirmed before service delivery.

In most cases, products and services are used together. Most outputs that organizations provide to customers, or are supplied to them by external providers, include both products and services. For example, a tangible or intangible product can have some associated service or a service can have some associated tangible or intangible product.

Table A1 – Major differences in terminology between ISO 9001:2008 and ISO 9001:2015

ISO 9001:2008	**ISO 9001:2015**
Products	Products and services
Exclusions	Not used (See clause A.5 for clarification of applicability.)
Management representative	Not used (Similar responsibilities and authorities are assigned, but no requirement for a single management representative.) ***NOTE: The 9100 standard has retained the term management representative***
Documentation, quality manual, documented procedures, records	Documented information
Work environment	Environment for the operation of processes
Monitoring and measuring equipment	Monitoring and measuring resources
Purchased product	Externally provided products and services
Supplier	External provider

A.3 UNDERSTANDING THE NEEDS AND EXPECTATIONS OF INTERESTED PARTIES

Sub-clause 4.2 specifies requirements for the organization to determine the interested parties that are relevant to the quality management system and the requirements of those interested parties. However, 4.2 does not imply extension of quality management system requirements beyond the scope of this Standard. As stated in the scope, this Standard is applicable where an organization needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and aims to enhance customer satisfaction.

There is no requirement in this Standard for the organization to consider interested parties where it has decided that those parties are not relevant to its quality management system. It is for the organization to decide if a particular requirement of a relevant interested party is relevant to its quality management system.

A.4 RISK-BASED THINKING

The concept of riskbased thinking has been implicit in previous editions of this Standard (e.g., through requirements for planning, review, and improvement). This Standard specifies requirements for the organization to understand its context (see 4.1) and determine risks as a basis for planning (see 6.1). This represents the application of riskbased thinking to planning and implementing quality management system processes (see 4.4), and will assist in determining the extent of documented information.

One of the key purposes of a quality management system is to act as a preventive tool. Consequently,

this Standard does not have a separate clause or sub-clause on preventive action. The concept of preventive action is expressed through the use of risk-based thinking in formulating quality management system requirements.

The risk based thinking applied in this Standard has enabled some reduction in prescriptive requirements and their replacement by performance-based requirements. There is greater flexibility than in ISO 9001:2008 in the requirements for processes, documented information, and organizational responsibilities.

Although 6.1 specifies that the organization shall plan actions to address risks, there is no requirement for formal methods for risk management or a documented risk management process. Organizations can decide whether or not to develop a more extensive risk management methodology than is required by this Standard (e.g., through the application of other guidance or standards).

Not all the processes of a quality management system represent the same level of risk in terms of the organization's ability to meet its objectives, and the effects of uncertainty are not the same for all organizations. Under the requirements of 6.1, the organization is responsible for its application of riskbased thinking and the actions it takes to address risk, including whether or not to retain documented information as evidence of its determination of risks.

Within aviation, space, and defense, risk is expressed as a combination of severity and likelihood of having a potential negative impact to processes, products, services, customer, or end users.

Due to the complexity of aviation, space, and defense processes, products, and services, and the severity of the potential consequences of failures, a formal process to manage operational risks is required in clause 8.1.1.

The operational risk management process is supported by specific requirements throughout clause 8, with the goal of developing an enhanced focus on:

- ***understanding risk impacts on operational processes;***
- ***making decisions on operational processes and actions to manage (e.g., prevent, mitigate, control) potential undesired effects.***

A.5 APPLICABILITY

This Standard does not refer to "exclusions" in relation to the applicability of its requirements to the organization's quality management system. However, an organization can review the applicability of requirements due to the size or complexity of the organization, the management model it adopts, the range of the organization's activities, and the nature of the risks and opportunities it encounters.

The requirements for applicability are addressed in 4.3, which defines conditions under which an organization can decide that a requirement cannot be applied to any of the processes within the scope of its quality management system. The organization can only decide that a requirement is not applicable if its decision will not result in failure to achieve conformity of products and services.

A.6 DOCUMENTED INFORMATION

As part of the alignment with other management system standards, a common clause on "documented information" has been adopted without significant change or addition (see 7.5). Where appropriate, text elsewhere in this Standard has been aligned with its requirements. Consequently, "documented information" is used for all document requirements.

Where ISO 9001:2008 used specific terminology such as "document" or "documented procedures", "quality manual" or "quality plan", this edition of this Standard defines requirements to "maintain documented information".

Where ISO 9001:2008 used the term "records" to denote documents needed to provide evidence of conformity with requirements, this is now expressed as a requirement to "retain documented information". The organization is responsible for determining what documented information needs to be retained, the period of time for which it is to be retained, and the media to be used for its retention.

A requirement to "maintain" documented information does not exclude the possibility that the organization might also need to "retain" that same documented information for a particular purpose (e.g., to retain previous versions of it).

Where this Standard refers to "information" rather than "documented information" (e.g., in 4.1: "The organization shall monitor and review the information about these external and internal issues"), there is no requirement that this information is to be documented. In such situations, the organization can decide whether or not it is necessary or appropriate to maintain documented information.

A.7 ORGANIZATIONAL KNOWLEDGE

In 7.1.6, this Standard addresses the need to determine and manage the knowledge maintained by the organization, to ensure the operation of its processes and that it can achieve conformity of products and services.

Requirements regarding organizational knowledge were introduced for the purpose of:

a. safeguarding the organization from loss of knowledge, e.g.,
   - through staff turnover;
   - failure to capture and share information;

b. encouraging the organization to acquire knowledge, e.g.,
   - learning from experience;
   - mentoring;
   - benchmarking.

A.8 CONTROL OF EXTERNALLY PROVIDED PROCESSES, PRODUCTS, AND SERVICES

All forms of externally provided processes, products, and services are addressed in 8.4, e.g., whether through:

a. purchasing from a supplier;

b. an arrangement with an associate company;

c. outsourcing processes to an external provider.

Outsourcing always has the essential characteristic of a service, since it will have at least one activity necessarily performed at the interface between the provider and the organization.

The controls required for external provision can vary widely depending on the nature of the processes, products, and services. The organization can apply risk-based thinking to determine the type and extent of controls appropriate to particular external providers and externally provided processes, products, and services.

ANNEX B – OTHER STANDARDS ON QUALITY MANAGEMENT AND QUALITY MANAGEMENT SYSTEMS DEVELOPED BY ISO/TC 176 (INFORMATIVE)

The Standards described in this annex have been developed by ISO/TC 176 to provide supporting information for organizations that apply this Standard, and to provide guidance for organizations that choose to progress beyond its requirements. Guidance or requirements contained in the documents listed in this annex do not add to, or modify, the requirements of this Standard.

Table B1 shows the relationship between these standards and the relevant clauses of this Standard.

This annex does not include reference to the sector-specific quality management system standards developed by ISO/TC 176.

This Standard is one of the three core standards developed by ISO/TC 176.

- ISO 9000, "Quality management systems – Fundamentals and vocabulary", provides an essential background for the proper understanding and implementation of this Standard. The quality management principles are described in detail in ISO 9000 and have been taken into consideration during the development of this Standard. These principles are not requirements in themselves, but they form the foundation of the requirements specified by this Standard. ISO 9000 also defines the terms, definitions, and concepts used in this Standard.
- ISO 9001 (this Standard) specifies requirements aimed primarily at giving confidence in the products and services provided by an organization and thereby enhancing customer satisfaction. Its proper implementation can also be expected to bring other organizational benefits, such as improved internal communication, better understanding, and control of the organization's processes.

- ISO 9004, "Managing for the sustained success of an organization – A quality management approach", provides guidance for organizations that choose to progress beyond the requirements of this Standard, to address a broader range of topics that can lead to improvement of the organization's overall performance. ISO 9004 includes guidance on a self-assessment methodology for an organization to be able to evaluate the level of maturity of its quality management system.

The Standards outlined below can provide assistance to organizations when they are establishing or seeking to improve their quality management systems, their processes, or their activities.

- ISO 10001, "Quality management – Customer satisfaction – Guidelines for codes of conduct for organizations", provides guidance to an organization in determining that its customer satisfaction provisions meet customer needs and expectations. Its use can enhance customer confidence in an organization and improve customer understanding of what to expect from an organization, thereby reducing the likelihood of misunderstandings and complaints.

- ISO 10002, "Quality management – Customer satisfaction – Guidelines for complaints handling in organizations", provides guidance on the process of handling complaints by recognizing and addressing the needs and expectations of complainants and resolving any complaints received. ISO 10002 provides an open, effective, and easy-to-use complaints process, including training of people. It also provides guidance for small businesses.

- ISO 10003, "Quality management – Customer satisfaction – Guidelines for dispute resolution external to organizations", provides guidance for effective and efficient external dispute resolution for productrelated complaints. Dispute resolution gives an avenue of redress when organizations do not remedy a complaint internally. Most complaints can be resolved successfully within the organization, without adversarial procedures.

- ISO 10004, "Quality management – Customer satisfaction – Guidelines for monitoring and measuring", provides guidelines for actions to enhance customer satisfaction and to determine opportunities for improvement of products, processes, and attributes that are valued by customers. Such actions can strengthen customer loyalty and help retain customers.

- ISO 10005, "Quality management systems – Guidelines for quality plans", provides guidance on establishing and using quality plans as a means of relating requirements of the process, product, project, or contract, to work methods and practices that support product realization. Benefits of establishing a quality plan are increased confidence that requirements will be met, that processes are in control and the motivation that this can give to those involved.

- ISO 10006, "Quality management systems – Guidelines for quality management in projects", is applicable to projects from the small to large, from simple to complex, from an individual project to being part of a portfolio of projects. ISO 10006 is to be used by personnel managing projects and who need to ensure that their organization is applying the practices contained in the ISO quality management system standards.

- ISO 10007, "Quality management systems – Guidelines for configuration management", is to assist organizations applying configuration management for the technical and administrative direction over the life cycle of a product. Configuration management can be used to meet the product identification and traceability requirements specified in this Standard.

- ISO 10008, "Quality management – Customer satisfaction – Guidelines for business-to-consumer electronic commerce transactions", gives guidance on how organizations can implement an effective and efficient business-to-consumer electronic commerce transaction (B2C ECT) system, and thereby provide a basis for consumers to have increased confidence in B2C ECTs, enhance the ability of organizations to satisfy consumers and help reduce complaints and disputes.

- ISO 10012, "Measurement management systems – Requirements for measurement processes and measuring equipment", provides guidance for the management of measurement processes and metrological confirmation of measuring equipment used to support and demonstrate compliance with metrological requirements. ISO 10012 provides quality management criteria for a measurement management system to ensure metrological requirements are met.

- ISO/TR 10013, "Guidelines for quality management system documentation", provides guidelines for the development and maintenance of the documentation necessary for a quality management system. ISO/TR 10013 can be used to document management systems other than those of the ISO quality management system standards (e.g., environmental management systems and safety management systems).

- ISO 10014, "Quality management – Guidelines for realizing financial and economic benefits", is addressed to top management. It provides guidelines for realizing financial and economic benefits through the application of quality management principles. It facilitates application of management principles and selection of methods and tools that enable the sustainable success of an organization.

- ISO 10015, "Quality management – Guidelines for training", provides guidelines to assist organizations in addressing issues related to training. ISO 10015 can be applied whenever guidance is required to interpret references to "education" and "training" within the ISO quality management system standards. Any reference to "training" includes all types of education and training.

- ISO/TR 10017, "Guidance on statistical techniques for ISO 9001:2000", explains statistical techniques which follow from the variability that can be observed in the behavior and results of processes, even under conditions of apparent stability. Statistical techniques allow better use of available data to assist in decision making, and thereby help to continually improve the quality of products and processes to achieve customer satisfaction.

- ISO 10018, "Quality management – Guidelines on people involvement and competence", provides guidelines which influence people involvement and competence. A quality management system depends on the involvement of competent people and the way that they are introduced and

integrated into the organization. It is critical to determine, develop, and evaluate the knowledge, skills, behavior, and work environment required.

- ISO 10019, "Guidelines for the selection of quality management system consultants and use of their services", provides guidance for the selection of quality management system consultants and the use of their services. It gives guidance on the process for evaluating the competence of a quality management system consultant and provides confidence that the organization's needs and expectations for the consultant's services will be met.
- ISO 19011, "Guidelines for auditing management systems", provides guidance on the management of an audit program, on the planning and conducting of an audit of a management system, as well as on the competence and evaluation of an auditor and an audit team. ISO 19011 is intended to apply to auditors, organizations implementing management systems, and organizations needing to conduct audits of management systems.

Table B1 – Relationship between other Standards on quality management and quality management systems and the clauses of this Standard

	Clauses in the 9100 Standard						
Other IAQG Standards	***4***	***5***	***6***	***7***	***8***	***9***	***10***
9101	***4.4***					***9.2***	
9102					***8.4.2,***		
8.5.1.3							
9103					***8.1, 8.3.5,***		
8.4.3, 8.5.1							
9107					***8.6***		
9114					***8.6***		
9115	***All***	***All***	***All***	***All***	***All***	***All***	***All***
9116					***8.3.6, 8.4.3,***		
8.5.6							
9131					***8.7***		***10.2***
9132					***8.5.2***		
9133					***8.4.2, 8.6***		
9134					***8.4.1***		
9162					***8.5.1, 8.6***		
NOTE: "All" indicates that all the sub-clauses in the specific clause of the 9100 standard are related to the other IAQG standard.							

NOTE: "All" indicates that all the sub-clauses in the specific clause of this Standard are related to the other Standards.

ANNEX C – OTHER STANDARDS ON QUALITY MANAGEMENT AND QUALITY MANAGEMENT SYSTEMS DEVELOPED BY THE INTERNATIONAL AEROSPACE QUALITY GROUP (INFORMATIVE)

The International Aerospace Quality Group (IAQG) standards described in this annex have been developed by the IAQG to provide supporting information for organizations that apply the 9100 standard, and to provide guidance for organizations that choose to progress beyond its requirements. Guidance or requirements contained in the documents listed in this annex do not add to, or modify, the requirements of the 9100 standard.

Table C1 shows the relationship between these standards and the relevant clauses of the 9100 standard.

The 9100 standard is one of the three quality management system standards developed by the IAQG.

- ***9100, "Quality Management Systems – Requirements for Aviation, Space, and Defense Organizations": This document standardizes quality management system requirements to the greatest extent possible and can be used at all levels of the supply chain by organizations around the world. Its use should result in improved quality, cost, and delivery performance through the reduction or elimination of organization-unique requirements, effective implementation of the quality management system, and wider application of good practice. While primarily developed for the aviation, space, and defense industry, this standard can also be used in other industry sectors when a quality management system with additional requirements over an ISO 9001 system is needed.***
- ***9110, "Quality Management Systems – Requirements for Aviation Maintenance Organizations": This document standardizes quality management system requirements to the greatest extent possible and can be used at all levels of the supply chain by organizations around the world. Its use should result in improved quality, schedule, and cost performance by the reduction or elimination of organization-unique requirements and wider application of good practice. While primarily developed for the civil and military aviation industry organizations providing maintenance services, this standard can also be used in other industry sectors when a quality management system with additional requirements over an ISO 9001 system is needed.***
- ***9120, "Quality Management Systems – Requirements for Aviation, Space and Defense Distributors": This standard is for use by organizations that procure parts, materials, and assemblies and resells these products to a customer in the aviation, space, and defense industries. This includes organizations that procure products and split them into smaller quantities including those that coordinate a customer or regulatory controlled process on the product. This standard is not intended for organizations that maintain or repair products, or for organizations that perform work that affect or could affect product characteristics or conformity.***

- ***The IAQG standards outlined below can provide assistance to organizations when they are establishing or seeking to improve their quality management systems, their processes or their activities.***
- ***9101, "Quality Management Systems – Audit Requirements for Aviation, Space, and Defense Organizations": This standard defines requirements for the preparation and execution of the audit process. In addition, it defines the content and composition for the audit reporting of conformity and process effectiveness to the 9100-series standards, the organization's QMS, and customer and statutory/regulatory requirements.***
- ***9102, "Aerospace First Article Inspection Requirement": This document standardizes FAI process requirements to the greatest extent possible and can be used at all levels of the supply chain by organizations around the world to provide a consistent process and documentation requirements for verification of aviation, space, and defense product. Its use should result in improved quality, schedule, and cost performance by the reduction or elimination of organization-unique requirements and wider application of good practices. While primarily developed for the aviation, space, and defense industry, this standard can also be used in other industry sectors where a standardized FAI process is needed.***
- ***9103, "Variation Management of Key Characteristics": This document standardizes requirements for "key characteristic" identification, control, documentation, and approval for the industry. The establishment of common requirements, for use at all levels of the supply chain by organizations, should result in improved quality and safety, and decreased costs, due to the elimination or reduction of organization-unique requirements and the resultant variation inherent in these multiple expectations.***
- ***9107, "Direct Delivery Authorization Guidance for Aerospace Companies": This document provides guidance to a production organization and a design organization on how to comply with the direct delivery authorization, including appropriate arrangement requirements.***
- ***9114, "Direct Ship Guidance for Aerospace Companies": This document standardizes requirements for the direct shipment of articles from a supplier of an approved manufacturer to a customer of an approved manufacturer and was originally produced as a cooperative effort between the Federal Aviation Administration (FAA) and the IAQG. The establishment of common expectations, for use at all levels of the supply-chain by organizations, should result in improved quality and safety, and decreased costs, due to the elimination or reduction of organization-unique requirements and the resultant variation inherent in these multiple expectations.***
- ***9115, "Quality Management Systems – Requirements for Aviation, Space and Defense Organizations – Deliverable Software": This document supplements the 9100 standard requirements for deliverable software and contains quality management system requirements for organizations that design, develop, and/or produce deliverable software***

and services for the aviation, space, and defense industry. This includes, as required, support software that is used in the development and maintenance of deliverable software and services. The deliverable software may be stand-alone, embedded, mobile application, or loadable into a target computer.

- ***9116, "Aerospace Series – Notice of Change (NOC) Requirements": This document was created to provide for the uniform submittal of change notifications and/or approval when contractually invoked at any level or as guidance within the aviation, space, and defense industries. This standard can be invoked as a stand-alone requirement or used in conjunction with AS/EN/JISQ 9100-series standards (i.e., 9100, 9110, 9120).***
- ***9131, "Quality Management Systems – Aerospace – Nonconformance Documentation": This document standardizes requirements for nonconformance data definition and documentation for the industry. The establishment of common requirements, for use at all levels of the supply-chain by organizations, should result in improved quality and safety, and decreased costs, due to the elimination or reduction of organization-unique requirements and the resultant variation inherent in these multiple expectations.***
- ***9132, "Data Matrix Quality Requirements for Parts Marking": This document standardizes data matrix quality requirements for parts marking for the industry. The establishment of common requirements, for use at all levels of the supply-chain by organizations, should result in improved quality and safety, and decreased costs, due to the elimination or reduction of organization-unique requirements and the resultant variation inherent in these multiple expectations.***
- ***9133, "Qualification Procedure for Aerospace Standard Products": This standard defines a system for the qualification of standard products for aviation, space, and defense applications. It defines the principles that shall be adhered to carry out product qualification; applied in conjunction with the rules and procedures of the Certification Authority (CA). The system enables the CA to confirm compliance is achieved and maintained, in accordance with the requirements of its product definition and associated controlling technical specifications by an Original Component Manufacturer (OCM) of standard products.***
- ***9134, "Supply Chain Risk Management Guideline": The guideline focuses on Quality as a key risk assessment factor taking into account elements from all aspects of the business having a direct link to global quality management. While traditional "small q" Quality is a key element to be assessed, from a company business point of view, other elements play an important part in minimizing risk. This guideline defines such risk factors for consideration.***
- ***9145, "Requirements for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP)": This standard establishes requirements for performing and documenting Advanced Product Quality Planning (APQP) and Production Part Approval***

Process (PPAP). APQP begins with conceptual product needs and extends through product definition, production planning, product & process validation (PPAP), Product use and post delivery service.

– *9162, "Aerospace Operator Self-Verification Programs": This standard is focused on standardizing, to the extent possible, operator self-verification practices in the aviation, space, and defense industry. Establishing common requirements practices should result in improved quality and safety, decreased costs, and elimination or reduction of organization-unique requirements.*

Table C1 – Relationship between other International Aerospace Quality Group standards on quality management and quality management systems and the clauses of the International Aerospace Quality Group 9100 standard

	Clauses in the 9100 Standard						
Other IAQG Standards	*4*	*5*	*6*	*7*	*8*	*9*	*10*
9101	*4.4*					*9.2*	
9102					*8.4.2,*		
8.5.1.3							
9103					*8.1, 8.3.5,*		
8.4.3, 8.5.1							
9107					*8.6*		
9114					*8.6*		
9115	*All*	*All*	*All*	*All*	*All*	*All*	*All*
9116					*8.3.6, 8.4.3,*		
8.5.6							
9131					*8.7*		*10.2*
9132					*8.5.2*		
9133					*8.4.2, 8.6*		
9134					*8.4.1*		
9162					*8.5.1, 8.6*		
NOTE: "All" indicates that all the sub-clauses in the specific clause of the 9100 standard are related to the other IAQG standard.							

ANNEX D – BIBLIOGRAPHY

[1] ISO 9004, *"Managing for the sustained success of an organization – A quality management approach"*

[2] ISO 10001, *"Quality management – Customer satisfaction – Guidelines for codes of conduct for organizations"*

[3] ISO 10002, *"Quality management – Customer satisfaction – Guidelines for complaints handling in organizations"*

[4] ISO 10003, *"Quality management – Customer satisfaction – Guidelines for dispute resolution external to organizations"*

[5] ISO 10004, *"Quality management – Customer satisfaction – Guidelines for monitoring and measuring"*

[6] ISO 10005, *"Quality management systems – Guidelines for quality plans"*

[7] ISO 10006, *"Quality management systems – Guidelines for quality management in projects"*

[8] ISO 10007, *"Quality management systems – Guidelines for configuration management"*

[9] ISO 10008, *"Quality management – Customer satisfaction – Guidelines for business-to-consumer electronic commerce transactions"*

[10] ISO 10012, *"Measurement management systems – Requirements for measurement processes and measuring equipment"*

[11] ISO/TR 10013, *"Guidelines for quality management system documentation"*

[12] ISO 10014, *"Quality management – Guidelines for realizing financial and economic benefits"*

[13] ISO 10015, *"Quality management – Guidelines for training"*

[14] ISO/TR 10017, *"Guidance on statistical techniques for ISO 9001:2000"*

[15] ISO 10018, *"Quality management – Guidelines on people involvement and competence"*

[16] ISO 10019, *"Guidelines for the selection of quality management system consultants and use of their services"*

[17] ISO 14001, *"Environmental management systems – Requirements with guidance for use"*

[18] ISO 19011, *"Guidelines for auditing management systems"*

[19] ISO 31000, *"Risk management – Principles and guidelines"*

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[28] www.iso.org/tc176/sc02/public

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ANNEX E – AVIATION, SPACE, AND DEFENSE BIBLIOGRAPHY

*9101** *Quality Management Systems – Audit Requirements for Aviation, Space, and Defense Organizations*

*9102** *Aerospace First Article Inspection Requirement*

*9103** *Variation Management of Key Characteristics*

*9107** *Direct Delivery Authorization Guidance for Aerospace Companies*

*9110** *Quality Management Systems – Requirements for Aviation Maintenance Organizations*

*9114** *Direct Ship Guidance for Aerospace Companies*

*9115** *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations – Deliverable Software*

*9116** *Aerospace Series – Notice of Change (NOC) Requirements*

*9120** *Quality Management Systems – Requirements for Aviation, Space and Defense Distributors*

*9131** *Quality Management Systems – Aerospace – Non conformance Documentation*

*9132** *Data Matrix Quality Requirements for Parts Marking*

*9133** *Qualification Procedure for Aerospace Standard Products*

*9134** *Supply Chain Risk Management Guideline*

*9145** *Requirements for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP)*

*9162** *Aerospace Operator Self-Verification Programs*

ISO 9001 Quality management systems – Requirements

www.iaqg.org IAQG Standards Support Material

IAQG Supply Chain Management Handbook

** Refers to the internationally harmonized standards published world-wide under the authority of the International Aerospace Quality Group (IAQG), coordinated by each of the IAQG sectors: the Americas Aerospace Quality Group (AAQG), Asia-Pacific Aerospace Quality Group (APAQG), and the European Aerospace Quality Group (EAQG).*

The IAQG Standards Register lists the current standards published within each IAQG sector; see http://www.sae.org/iaqg/publications/standardsregister.pdf.

LIST OF APPENDIX

APPENDIX `A' AFQMS(F)-1001	Format of application for grant of approval/renewal to a Firm by DGAQA
APPENDIX `B' AFQMS(F)-1002	Specimen for Release Note Certificate
APPENDIX `C' AFQMS(F)-1003	Categories of Approvals
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LIST OF AQA Directives

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AQA Directive No. 01/ 2015	Guidelines for QTP and ATP of Ground Equipments / Jigs for Airborne Stores (Electrical and Electronics) (Issue-II)
AQA Directive No. 04-03/2015	Environmental stress Screening (ESS)
AQA directive No 05-01/2016	Certificate of Safety of Flight (Form 1090), its format and necessary instruction (F-1090)
AQA directive No.06/2018	***Guidelines for Kit Inspection of electronic, mechanical components and consumables for Airborne LRUs/ Modules***
AQA Directive No. 08/2019	***PDI during Foreign Acquisitions (Guidelines)***
AQA Directive No. 07/2020	***Guidelines for QA during PCB Soldering Process***
AQA Directive No. 9/2020	***Guidelines for QA during Central Procurement Process as per DPM & DPP (SQR's & RFP's)***
AQA Directive No. 05/2019	***Standard Template For ATP for the product manufactured in India.***
AQA Directive No. 10/2022	***Guidelines for FOD Management: Prevention and Control.***
AQA Directive 11/2022	***Qualification Test Procedure and Acceptance Test Procedures for Ground Equipments***
AQA Directive 12/2023	***Guidelines on QA coverage Through Remote/Hybrid Inspection & verification.***

LIST OF ACRONYMS

ADG	Additional Director General
AFQMS	Approval of Firm and its Quality Management System
AHSP	Authority Holding of Sealed Particulars
ALMs	Air Launched Missiles
AMD	Aircraft Manufacturing Division
AQA	Aeronautical Quality Assurance
AQAP	Allied Quality Assurance Publication
AS	Aerospace Standard
ASDOA	Air System Design Organisation Approval
ASPOA	Air System Production Organisation Approval
ASMOA	Air System Maintenance Organisation Approval
ASNT	American Society for Non Destructive Testing
ATE	Automated Test Equipment
ATF	Aviation Turbine Fuel
ATP	Acceptance Test Plan
ATR	Acceptance Test report
BRD	Base Repair Depot
B Sc	Bachelor of Science
BOM	Bill Of Material
CAR	Corrective Action Requirement
CEMILAC	Centre for Military Airworthiness & Certification
CM	Configuration Management
CMD	Chairman and Managing Director
CMP	Configuration Management Plan
CoA	Certificate of Airworthiness
CoC	Certificate of Conformity
CoD	Certificate of Design
CQSP	Common Quality Surveillance Plan
CSI	Customer Satisfaction Index
CTQ	Critical To Quality
DDPMAS	Design, Development & Production of Military Airborne Stores
DG	Director General
DGAQA	Directorate General of Aeronautical Quality Assurance
DGCA	Directorate General of Civil Aviation
DPSUs	Defence Public Sector Undertakings
DRDO	Defence Research Development Organisation

DPT	Dye Penetrant Test
ERP	Enterprise Resource Planning
FAIR	First Article Inspection Report
FCC	Flight Clearance Certificate
FOC	Final Operational Clearance
FOD	Foreign Object Damage/Debris
FSR	Field Service Representative
FOL	Fuel, Oil and Lubricants
GHE	Ground Handling Equipment
GoI	Government of India
GQA	Government Quality Assurance
GSE	Ground Support Equipment
HOQ	Head Of Quality
HQ	Head Quarters
IA	Indian Army
IAF	Indian Air Force
IAQG	International Aerospace Quality Group
ICG	Indian Coast Guard
IEEE	Institute of Electrical & Electronic Engineering
IIT	Indian Institute of Technology
IMAP	Indian Military Airworthiness Procedure
IOC	Initial Operational Clearance
IPC	Institute of Printed Circuit
ISNT	Indian Society for Non Destructive Testing
ISO	International Organization for Standards
ISRO	Indian Space Research Organization
IV & V	Independent Verification & Validation
JRI	Joint Receipt Inspection
JSQR	Joint Service Quality Requirement
LAN	Local Area Network
LoA	Letter of Approval
MAG(Avn)	Maintainability Advisory Group (Aviation)
MDI	Master Drawing Index
MoD	Ministry of Defence
MoM	Minutes of Meeting
MTC	Military Type Certificate
NABL	National Accreditation Board for Testing & Calibration Laboratories
NADCAP	National Aerospace and Defence Contractor Accreditation Program

NAL	National Aerospace Laboratory
NC	Non-Conformance
NDT	Non Destructive Testing
OEM	Original Equipment Manufacturer
OFs	Ordnance Factories
ORDAQA	Office of Regional Director Aeronautical Quality Assurance
PATP	Production Acceptance Test Plan
PCC	Provisional Clearance Certificate
PDI	Pre-Dispatch Inspection
PQT	Periodic Qualification Test
PB No	Permanent Badge Number
PSUs	Public Sector Undertakings
QA	Quality Assurance
QAP	Quality Assurance Plan
QASP	Quality Assurance Standard Procedure
QC	Quality Control
QTP	Qualification Test Procedure
QMS	Quality Management System
QPIs	Quality Performance Indicators
QRMM	Quality Rating Maturity Model
R&D	Research & Development
RCMA	Regional Centre for Military Airworthiness
RD	Regional Director
RDAQA	Regional Director, Aeronautical Quality Assurance
RFP	Request For Proposal
RTCA	Radio Technical Commission for Aeronautics
SAG	Senior Administrative Grade
Secy(DP)	Secretary (Defence Production)
SOP	Standard of Preparation
SOFT	Safety Of Flight Test
TA	Type Approval
TAA	Technical Airworthiness Authorities
ToT	Transfer of Technology
TTGE	Tool Tester Ground Equipment
UAS	Unmanned Aircraft System
UAV	Unmanned Aerial Vehicle

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